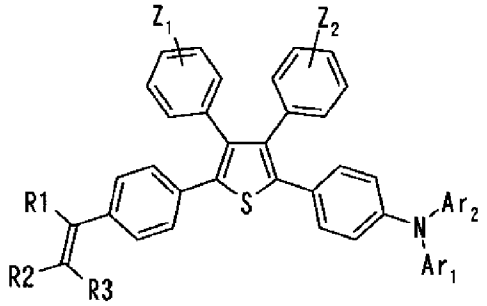
[Document Name]Description

[Title of the Invention]An organic electroluminescence element and a new CHIOFEN compound

[Claim(s)]

[Claim 1]An organic electroluminescence element which pinches further at least a layer which carries out kind content of the compound expressed with a general formula (1) to inter-electrode [a pair of] at least.
[Chemical formula 1]



(1)

the inside of a formula, and R1-R3 -- respectively -- independent -- a hydrogen atom, a straight chain, branching, or an annular alkyl group. An aralkyl group which is not replaced [an aryl group which is not replaced / substitution or /, substitution, or] is expressed, Ar_1 and Ar_2 express an aryl group which is not replaced [substitution or], . Ar_1 and Ar_2 may form nitrogen-

containing heterocycle with a united nitrogen atom. Carrying out a table, Z_1 and Z_2 express an amino group which is not replaced [an aralkyl group which is not replaced / an aryl group which is not replaced / a hydrogen atom, a halogen atom, a straight chain, branching or an annular alkyl group, a straight chain, branching or an annular alkoxy group, substitution, or /, substitution, or /, substitution, or].

[Claim 2]The organic electroluminescence element according to claim 1, wherein a layer containing a compound denoted by a general formula (1) contains a luminescent organic metal complex further.

[Claim 3]a layer containing a compound denoted by a general formula (1) -- further -- doria -- the organic electroluminescence element containing a reel amine derivative according to claim 1.

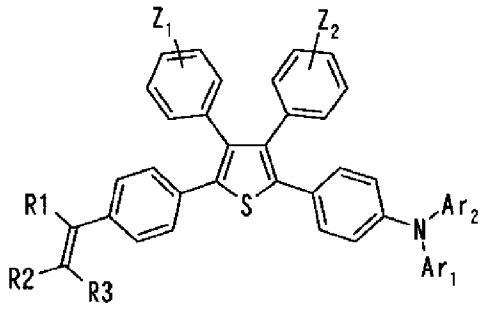
[Claim 4]The organic electroluminescence element according to claim 1 to 3 whose layer containing a compound denoted by a general formula (1) is a luminous layer.

[Claim 5]The organic electroluminescence element according to claim 1 whose layer containing a compound denoted by a general formula (1) is electron hole pouring transportation ****.

[Claim 6]The organic electroluminescence element according to claim 1 to 4 which has an electron hole pouring transportation layer further in inter-electrode [a pair of].

[Claim 7]The organic electroluminescence element according to claim 1 to 6 which has an electronic pouring transportation layer further in inter-electrode [a pair of].

[Claim 8]A CHIOFEN compound denoted by the following general formula (1).
[Chemical formula 2]



(1)

the inside of a formula, and R1-R3 -- respectively -- independent -- a hydrogen atom, a straight chain, branching, or an annular alkyl group. An aralkyl group which is not replaced [an aryl group which is not replaced / substitution or /, substitution, or] is expressed, Ar_1 and Ar_2 express an aryl group which is not replaced [substitution or], . Ar_1 and Ar_2 may form nitrogen-containing heterocycle with a united nitrogen atom. Carrying out a table, Z_1 and Z_2 express an amino group which is not replaced [an aralkyl group which is not replaced / an aryl group which is not replaced / a hydrogen atom, a halogen atom, a straight chain, branching or an annular alkyl group, a straight chain, branching or an annular alkoxy group, substitution, or /, substitution, or /, substitution, or].

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the new compound which can be used conveniently for an organic electroluminescence element and this light emitting element.

[0002]

[Description of the Prior Art]Conventionally, although used as panel type light sources, such as backlight, for example, in order to make this light emitting element drive, the high voltage of exchange is required for an inorganic electroluminescence element. These days came and the organic electroluminescence element (organic-electroluminescence element: organic EL device) which used organic materials for the luminescent material was developed [Appl.Phys.Lett., 51,913 (1987)]. An organic electroluminescence element has the structure

pinched between an anode and the negative pole in the thin film containing a fluorescence organic compound, and pours an electron and an electron hole (hole) into this thin film, It is an element which emits light using the light emitted when an exciton (exciton) is made to generate and this exciton is deactivated by making it re-join together. an organic electroluminescence element -- severalV - several 10 -- it is a low voltage of about V direct current, and luminescence of various colors (for example, red, blue, green) is possible by being able to emit light and choosing the kind of fluorescence organic compound. The application to various light emitting elements, a display element, etc. is expected from the organic electroluminescence element which has such a feature. However, generally, luminescence luminosity is low and is not enough practically.

[0003]As a method of raising luminescence luminosity, tris (8-quinolate) aluminum as a luminous layer, for example A host compound, [J. as which the organic electroluminescence element using the coumarin derivative and the pyran derivative as a guest compound (dopant) is proposed Appl.Phys., 65, 3610(1989)]. Bis(2-methyl 8-quinolate)(4-phenyl phenolate) aluminum as a luminous layer, for example A host compound, The organic electroluminescence element using the AKURIDON derivative (for example, N-methyl 2-methoxy AKURIDON) as a guest compound is proposed (JP,H8-67873,A). However, these light emitting elements are also hard to be referred to as having sufficient luminescence luminosity. Now, an organic electroluminescence element which emits light to high-intensity further is desired.

[0004]

[Problem to be solved by the invention]The technical problem of this invention is providing the organic electroluminescence element which is excellent in luminous efficiency and emits light to high-intensity. It is providing the new compound which can be used conveniently for this light emitting element.

[0005]

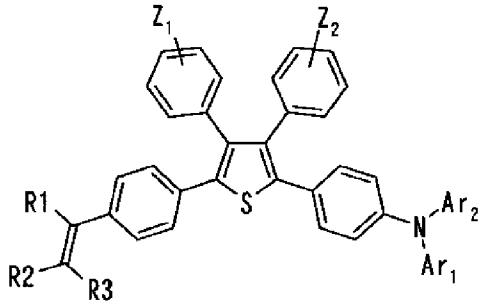
[Means for solving problem]This invention persons came to complete this invention, as a result

of examining an organic electroluminescence element wholeheartedly.

[0006]namely, this invention -- (1) -- the organic electroluminescence element which pinches further at least the layer which carries out kind content of the compound expressed with a general formula (1) to inter-electrode [a pair of] at least,

[0007]

[Chemical formula 3]



(1)

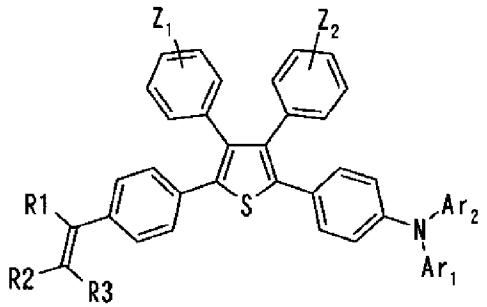
the inside of a formula, and R1-R3 -- respectively -- independent -- a hydrogen atom, a straight chain, branching, or an annular alkyl group. The aralkyl group which is not replaced [the aryl group which is not replaced / substitution or /, substitution, or] is expressed, Ar_1 and Ar_2 express the aryl group which is not replaced [substitution or], . Ar_1 and Ar_2 may form nitrogen-containing heterocycle with a united nitrogen atom. Carrying out a table, Z_1 and Z_2 express the amino group which is not replaced [the aralkyl group which is not replaced / the aryl group which is not replaced / a hydrogen atom, a halogen atom, a straight chain, branching or an annular alkyl group, a straight chain, branching or an annular alkoxy group, substitution, or /, substitution, or /, substitution, or].

[0008](2) An organic electroluminescence element given in aforementioned (1) to which the layer containing the compound denoted by a general formula (1) is further characterized by containing a luminescent organic metal complex, (3) the layer containing the compound denoted by a general formula (1) -- further -- doria -- an organic electroluminescence element given in aforementioned (1) containing a reel amine derivative. (4) Aforementioned (1) whose layer containing the compound denoted by a general formula (1) is a luminous layer - an organic electroluminescence element given in (3), (5) An organic electroluminescence element

given in aforementioned (1) whose layer containing the compound denoted by a general formula (1) is an electron hole pouring transportation layer, (6) aforementioned (1) which has an electron hole pouring transportation layer further in inter-electrode [a pair of] - an organic electroluminescence element given in (4), and (7) -- the CHIOFEN compound further expressed with the organic electroluminescence element of a description, and the (8) following general formula (1) to aforementioned (1) which has an electronic pouring transportation layer - (6) by inter-electrode [a pair of],

[0009]

[Chemical formula 4]



(1)

the inside of a formula, and R1-R3 -- respectively -- independent -- a hydrogen atom, a straight chain, branching, or an annular alkyl group. The aralkyl group which is not replaced [the aryl group which is not replaced / substitution or /, substitution, or] is expressed, Ar_1 and Ar_2 express the aryl group which is not replaced [substitution or], . Ar_1 and Ar_2 may form nitrogen-containing heterocycle with a united nitrogen atom. Carry out a table and Z_1 and Z_2 A hydrogen atom, a halogen atom, a straight chain, The amino group which is not replaced [the aralkyl group which is not replaced / the aryl group which is not replaced / branching or an annular alkyl group, a straight chain, branching or an annular alkoxy group, substitution, or /, substitution, or /, substitution, or] is expressed. It is related.

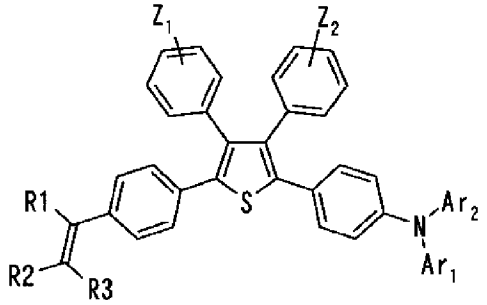
[0010]

[Mode for carrying out the invention]Hereafter, this invention is explained in detail. The organic electroluminescence element of this invention pinches further at least the layer which carries out kind content of the compound expressed with a general formula (1) to inter-electrode [a

pair of] at least.

[0011]

[Chemical formula 5]



(1)

the inside of a formula, and R1-R3 -- respectively -- independent -- a hydrogen atom, a straight chain, branching, or an annular alkyl group. The aralkyl group which is not replaced [the aryl group which is not replaced / substitution or /, substitution, or] is expressed, Ar_1 and Ar_2 express the aryl group which is not replaced [substitution or], . Ar_1 and Ar_2 may form nitrogen-containing heterocycle with a united nitrogen atom. Carrying out a table, Z_1 and Z_2 express the amino group which is not replaced [the aralkyl group which is not replaced / the aryl group which is not replaced / a hydrogen atom, a halogen atom, a straight chain, branching or an annular alkyl group, a straight chain, branching or an annular alkoxy group, substitution, or /, substitution, or /, substitution, or].

[0012]In the compound denoted by a general formula (1), R1-R3 express independently the aralkyl group which is not replaced [the aryl group which is not replaced / a hydrogen atom, a straight chain, branching or an annular alkyl group substitution, or /, substitution, or], respectively. In this invention, an aryl group expresses heterocyclic aromatic series machines, such as carbocyclic aromatic series machines, for example, a frill machine, such as a phenyl group, a naphthyl group, and an anthryl group, a thienyl group, and a pyridyl group, for example. In the compound denoted by a general formula (1), the aryl group and aralkyl group of R1-R3 may have a substituent, substituents, such as a halogen atom, the straight chain of the carbon numbers 1-16, branching or an annular alkyl group, a straight chain of the carbon numbers 1-16, branching or an annular alkoxy group, an aryl group of the carbon numbers 3-

25, and an aralkyl group of the carbon numbers 5-16, -- single substitution -- or it may be many replaced.

[0013]Preferably R1-R3 A hydrogen atom, the straight chain of the carbon numbers 1-16, branching, or an annular alkyl group, The heterocyclic aromatic series machine which is not replaced [the substitution of the carbocyclic aromatic series machine which is not replaced / the substitution of the carbon numbers 6-25, or /, and the carbon numbers 3-25, or], Or are an aralkyl group which is not replaced [the substitution of the carbon numbers 5-16 or], and more preferably, The carbocyclic aromatic series machine which is not replaced [the substitution of a hydrogen atom, the straight chain of the carbon numbers 1-10, branching or an annular alkyl group, and the carbon numbers 6-12, or], Are an aralkyl group which is not replaced [the substitution of the heterocyclic aromatic series machine which is not replaced / the substitution of the carbon numbers 4-12, or /, or the carbon numbers 7-12, or], and still more preferably, It is a heterocyclic aromatic series machine which is not replaced [the substitution of the carbocyclic aromatic series machine which is not replaced / the substitution of a hydrogen atom, the straight chain of the carbon numbers 1-8, branching or an annular alkyl group, and the carbon numbers 6-10, or /, and the carbon numbers 4-10, or].

[0014]As an example of R1-R3, a hydrogen atom, a methyl group, an ethyl group, n-propyl group, An isopropyl group, n-butyl group, an isobutyl machine, a sec-butyl group, A tert-butyl group, n-pentyl group, an iso pentyl group, a neopentyl machine, A tert-pentyl group, a cyclopentylic group, n-hexyl group, 1-methyl pentyl group, 4-methyl 2-pentyl-group, 3, and 3-JIMECHIRU butyl group, 2-ethyl butyl group, A cyclohexyl group, n-heptyl group, 1-methylhexyl machine, a cyclohexyl methyl group, A 4-tert-butyl cyclohexyl group, n-heptyl group, a cycloheptyl machine, n-octyl group, a cyclo octyl group, a tert-octyl group, 1-methyl heptyl group, 2-ethylhexyl machine, 2-propyl pentyl-group, n-nonyl-group, 2, and 2-JIMECHIRU heptyl group, 2, a 6-********- 4-heptyl group, 3 and 5, 5-trimethylhexyl machine, Straight chains, such as n-decyl group, n-Ung decyl group, 1-methyldecyl machine, n-dodecyl group, n-tridecyl machine, 1-hexyl heptyl group, n-tetradecyl machine, an n-pentadecyl group, an n-hexadecyl machine, an n-heptadecyl machine, n-octadecyl group, and n-eicosyl machine, Branching or an annular alkyl group,

[0015]A phenyl group, 4-methylphenyl machine, 3-methylphenyl machine, 2-methylphenyl machine, 4-ethyl phenyl group, 3-ethyl phenyl group, 2-ethyl phenyl group, A 4-n-propyl phenyl

group, 4-isopropyl phenyl group, 2-isopropyl phenyl group, A 4-n-buthylphenyl machine, 4-isobutyl phenyl group, a 4-sec-buthylphenyl machine, A 2-sec-buthylphenyl machine, a 4-tert-buthylphenyl machine, A 3-tert-buthylphenyl machine, a 2-tert-buthylphenyl machine, A 4-n-pentyl phenyl group, a 4-iso pentyl phenyl group, a 4-neopentyl phenyl group, A 4-tert-pentyl phenyl group, a 4-n-hexyl phenyl group, 4-(2'-ethyl butyl) phenyl group, a 4-n-HEPUCHIRU phenyl group, A 4-n-octyl phenyl group, 4-(2'-ethylhexyl) phenyl group, A 4-n-NONIRU phenyl group, a 4-n-DESHIRU phenyl group, a 4-n-UNDESHIRU phenyl group, A 4-n-DODESHIRU phenyl group, a 4-n-tetradecyl phenyl group, 4-cyclohexyl phenyl group, 4-(4'-methylcyclohexyl) phenyl group, 4-(4'-tert-butyl cyclohexyl) phenyl group, 3-cyclohexyl phenyl group, 2-cyclohexyl phenyl group, 2, 3-dimethylphenyl machine, 2, 4-dimethylphenyl machine, 2, 5-dimethylphenyl machine, 2, 6-dimethylphenyl machine, 3, 4-dimethylphenyl machine, 3, 5-dimethylphenyl machine, 3 and 4, 5-trimethyl phenyl machine, 2, 3, 5, a 6-tetramethyl phenyl group, 2, 4-JIECHIRU phenyl group, 2, 6-JIECHIRU phenyl group, 2, 5-diisopropylphenyl machine, 2, 6-diisopropylphenyl machine, 2, a 6-diisobutyl phenyl group, 2, a 4-G tert-buthylphenyl machine, 2, a 5-G tert-buthylphenyl machine, 4, a 6-G tert-butyl 2-methylphenyl machine, a 5-tert-butyl 2-methylphenyl machine, the 4-tert-butyl 2, 6-dimethylphenyl machine,

[0016]4-methoxypheny machine, 3-methoxypheny machine, 2-methoxypheny machine, A 4-ethoxy phenyl group, a 3-ethoxy phenyl group, a 2-ethoxy phenyl group, A 4-n-propyloxy phenyl group, a 3-n-propyloxy phenyl group, 4-isopropyloxy phenyl group, 2-isopropyloxy phenyl group, A 4-n-butyloxy phenyl group, 4-isobutyloxy phenyl group, A 2-sec-butyloxy phenyl group, a 4-n-pentyloxy phenyl group, 4-isopentyloxy phenyl group, 2-isopentyloxy phenyl group, A 4-neo pentyloxy phenyl group, a 2-neo pentyloxy phenyl group, A 4-n-hexyloxy phenyl group, 4-(2'-ethyl butyl) OKISHI phenyl group, A 4-n-heptyloxy phenyl group, a 4-n-octyloxy phenyl group, A 4-n-nonyloxy phenyl group, a 4-n-decyloxy phenyl group, A 4-n-undecyloxy phenyl group, a 4-n-dodecyloxy phenyl group, a 4-n-tetra-decyloxy phenyl group, 4-cyclohexyloxy phenyl group, 2-cyclohexyloxy phenyl group, 2, 3-dimethoxy phenyl group, 2, 4-dimethoxy phenyl group. 2, 5-dimethoxy phenyl group, 3, 4-dimethoxy phenyl group, 3, 5-dimethoxy phenyl group, 3, 5-diethoxy phenyl group, a 2-methoxy 4-methylphenyl machine, A 2-methoxy 5-methylphenyl machine, a 2-methyl 4-methoxypheny machine, A 3-methyl 4-methoxypheny machine, a 3-methyl 5-methoxypheny machine, 4-phenyl phenyl group, 3-phenyl phenyl group, 2-phenyl phenyl group, 4-(4'-methylphenyl) phenyl group, 4-(3'-methylphenyl) phenyl group, 4-(4'-ethyl phenyl) phenyl group, 4-(4'-isopropyl phenyl) phenyl group, 4-(4'-tert-buthylphenyl) phenyl group, 4-(4'-n-hexyl phenyl) phenyl group, 4-(4'-n-octyl phenyl) phenyl group, 4-(4'-methoxypheny) phenyl group, 4-(4'-n-butyloxy phenyl) phenyl group, 2-(2'-methoxypheny) phenyl group, 4-(4'-chlorophenyl) phenyl group, a 3-methyl 4-

phenyl phenyl group, a 3-methoxy 4-phenyl phenyl group,

[0017]4-fluoro phenyl group, 3-fluoro phenyl group, 2-fluoro phenyl group, 4-chlorophenyl machine, a 3-chlorophenyl machine, 2-chlorophenyl machine, 4-bromo phenyl group, 2-bromo phenyl group, 4-trifluoro methylphenyl machine, 2, a 3-difluoro phenyl group, 2, a 4-difluoro phenyl group, 2, a 5-difluoro phenyl group, 2, a 6-difluoro phenyl group, 3, a 4-difluoro phenyl group, 3, a 5-difluoro phenyl group, 2, 3-dichlorophenyl machine, 2, 4-dichlorophenyl machine, 2, 5-dichlorophenyl machine, 3, 4-dichlorophenyl machine, 3, 5-dichlorophenyl machine, 2, 5-dibromo phenyl group, 2, 4, 6-bird chlorophenyl machine, a 2-fluoro 4-methylphenyl machine, A 2-fluoro 5-methylphenyl machine, a 3-fluoro 2-methylphenyl machine, A 3-fluoro 4-methylphenyl machine, a 2-methyl 4-fluoro phenyl group, A 2-methyl 5-fluoro phenyl group, a 3-methyl 4-fluoro phenyl group, a 2-chloro 4-methylphenyl machine, a 2-chloro 5-methylphenyl machine, a 2-chloro 6-methylphenyl machine, a 3-chloro 4-methylphenyl machine, 2-methyl 3-chlorophenyl machine, a 2-methyl 4-chlorophenyl machine, A 3-methyl 4-chlorophenyl machine, the 2-chloro 4, 6-dimethylphenyl machine, A 2-methoxy 4-fluoro phenyl group, a 3-methoxy 4-fluoro phenyl group, A 2-fluoro 4-methoxypheny machine, a 2-fluoro 4-ethoxy phenyl group, A 2-fluoro 6-methoxypheny machine, a 3-fluoro 4-methoxypheny machine, A 3-fluoro 4-ethoxy phenyl group, a 2-chloro 4-methoxypheny machine, A 3-chloro 4-methoxypheny machine, a 2-methoxy 5-chlorophenyl machine, a 3-methoxy 4-chlorophenyl machine, a 3-methoxy 6-chlorophenyl machine, the 5-chloro 2, 4-dimethoxy phenyl group,

[0018]1-naphthyl group, 2-naphthyl group, a 4-methyl 1-naphthyl group, a 4-ethyl 1-naphthyl group, A 6-n-butyl 2-naphthyl group, a 6-tert-butyl 2-naphthyl group, A 7-ethyl 2-naphthyl group, 1, a 6-********- 2-naphthyl group, A 2-methoxy 1-naphthyl group, a 4-methoxy 1-naphthyl group, a 4-n-butyloxy 1-naphthyl group, A 5-ethoxy 1-naphthyl group, a 6-methoxy 2-naphthyl group, a 6-ethoxy 2-naphthyl group, A 6-n-butyloxy 2-naphthyl group, a 6-n-hexyloxy 2-naphthyl group, A 7-methoxy 2-naphthyl group, a 7-n-butyloxy 2-naphthyl group, A 6-fluoro 2-naphthyl group, a 6-chloro 2-naphthyl group, 2, a 4-dichloro 1-naphthyl group, 1, a 6-dichloro 2-naphthyl group, 1, 2 and 3, a 4-tetrahydro 5-naphthyl group, 1, 2, 3, a 4-tetrahydro 6-naphthyl group, 5-indanyl machine, 1-anthryl group, 2-anthryl group, 9-anthryl group, a 10-fluoro 9-anthryl group, 9, a 10-********- 1-anthryl group, a 10-methyl 9-anthryl group, 9, a 10-********- 2-anthryl group, A 10-ethoxy 9-anthryl group, a 10-phenyl 9-anthryl group, 2-fluorenyl group, 3-fluorenyl group, a 7-methyl 2-fluorenyl group, A 9-methyl 2-fluorenyl group, a 9-ethyl 2-fluorenyl group, A 9 and 9-********- 2-fluorenyl group, 9, and 9-********- 2-fluorenyl group, The carbocyclic aromatic series machine which is not replaced [substitution, such as a 9-phenyl 2-

fluorenyl group, 9, and 9-diphenyl 2-fluorenyl group, a 9-methyl 9-phenyl 2-fluorenyl group and a 9-ethyl 9-phenyl 2-fluorenyl group, or],

[0019]4-quinolyl machine, 3-quinolyl machine, a 4-methyl 2-quinolyl machine, 4-pyridyl group, 3-pyridyl group, 2-pyridyl group, a 4-methyl 2-pyridyl group, a 5-methyl 2-pyridyl group, A 6-methyl 2-pyridyl group, a 6-fluoro 3-pyridyl group, a 6-methoxy 3-pyridyl group, A 6-methoxy 2-pyridyl group, 3-frill machine, 2-frill machine, 3-thienyl group, 2-thienyl group, a 4-methyl 3-thienyl group, a 5-methyl 2-thienyl group, A 3-methyl 2-thienyl group, 2-oxazolyl machine, 2-thiazolyl machine, The heterocyclic aromatic series machine which is not replaced [substitution, such as 2-benzoxazolyl machine, 2-benzothiazolyl machine, and a 2-benzoimidazolyl group, or], Benzyl group, FENECHIRU machine, alpha-methylbenzyl machine, alpha, and alpha-dimethylbenzyl machine, 1-Naff Chill methyl group, 2-Naff Chill methyl group, a full frill machine, 2-methylbenzyl machine, 3-methylbenzyl machine, 4-methylbenzyl machine, 4-ethyl benzyl group, 4-isopropyl benzyl group, a 4-tert-butylbenzyl machine, a 4-n-hexyl benzyl group, a 4-n-Noni Reuben Jill machine, 3, 4-dimethylbenzyl machine, 3-methoxybenzyl group, 4-methoxybenzyl group, 4-ethoxybenzyl machine, a 4-n-butyloxy benzyl group, a 4-n-hexyloxy benzyl group, The aralkyl group etc. which is not replaced [substitution, such as a 4-n-nonyloxy benzyl group, 3-fluoro benzyl group, 4-fluoro benzyl group, 2-chloro benzyl group, and 4-chloro benzyl group or] can be mentioned.

[0020]In the compound denoted by a general formula (1), Ar_1 and Ar_2 express the aryl group which is not replaced [substitution or], and Ar_1 and Ar_2 express further ** which may form nitrogen-containing heterocycle with a united nitrogen atom. In the compound denoted by a general formula (1), [Ar_1 and Ar_2] As un-replacing or a substituent, preferably A halogen atom, an alkyl group, By the alkoxy group or an aryl group, are an aryl group of single substitution or the total carbon numbers 4-25 which may be many replaced, and more preferably, As un-replacing or a substituent, a halogen atom, the alkyl group of the carbon numbers 1-10, By the carbon number 1 - 10 alkoxy groups or the carbon number 5 - 10 aryl groups, single substitution or the carbocyclic aromatic series machine of the total carbon numbers 6-25 which may be many replaced, Or are a heterocyclic aromatic series machine of the total carbon numbers 4-25, and still more preferably, They are single substitution or the carbocyclic aromatic series machine of the total carbon numbers 6-20 which may be many replaced as un-replacing or a substituent in a halogen atom, the alkyl group of the carbon numbers 1-4, the carbon number 1 - 4 alkoxy groups or the carbon number 6 - 10 aryl groups.

[0021]As an example of Ar_1 and Ar_2, the heterocyclic aromatic series machine quoted as an example of R1-R3 which is not replaced [the carbocyclic aromatic series machine which is not replaced / substitution or / and substitution, or] can be mentioned, for example.

[0022]Further, in the compound denoted by a general formula (1), Ar_1 and Ar_2 may form nitrogen-containing heterocycle with a united nitrogen atom, and preferably, NAr_1Ar_2 - N-carbazolyl machine which is not replaced [substitution or], The N-benzo[b] carbazolyl machine which is not replaced [the N-benzo[a] carbazolyl machine which is not replaced / substitution or /, substitution or], The N-a and dibenzo [i] carbazolyl machine which is not replaced [the N-benzo[c] carbazolyl machine which is not replaced / substitution or /, substitution, or], The N-c and dibenzo [g] carbazolyl machine which is not replaced [the N-b and dibenzo [h] carbazolyl machine which is not replaced / substitution or /, substitution or], N-FENOCHIAJINIIRU machine which is not replaced [N-FENOKISAJINIIRU machine which is not replaced / substitution or /, substitution or], The N-b and dibenzo [f] AZEPINIRU machine which is not replaced [N-AKURIDANIRU machine which is not replaced / substitution or /, substitution, or], Are an N-bird b, d, and benzo[f] AZEPINIRU machine which is not replaced [9 which is not replaced / substitution or /, a 10-dihydroN-b and dibenzo [f] AZEPINIRU machine, substitution, or], and more preferably, The N-benzo[b] carbazolyl machine which is not replaced [the N-benzo[a] carbazolyl machine which is not replaced / N-carbazolyl machine which is not replaced / substitution or /, substitution, or /, substitution, or]. The N-a and dibenzo [i] carbazolyl machine which is not replaced [the N-benzo[c] carbazolyl machine which is not replaced / substitution or /, substitution, or], The N-c and dibenzo [g] carbazolyl machine which is not replaced [the N-b and dibenzo [h] carbazolyl machine which is not replaced / substitution or /, substitution or], It is N-FENOCHIAJINIIRU which is not replaced [N-FENOKISAJINIIRU machine which is not replaced / substitution or /, substitution or], and is N-FENOCHIAJINIIRU which is not replaced [N-FENOKISAJINIIRU machine which is not replaced / N-carbazolyl machine which is not replaced / substitution or /, substitution, or /, substitution, or] still more preferably. [as a substituent of $-NAr_1Ar_2$ in the case of forming nitrogen-containing heterocycle with the nitrogen atom which Ar_1 and Ar_2 have combined] Preferably, are a halogen atom, an alkyl group of the carbon numbers 1-10, an alkoxy group of the carbon numbers 1-10, or an aryl group of the carbon numbers 6-10, and more preferably, They are a halogen atom, an alkyl group of the carbon numbers 1-4, an alkoxy group of the carbon numbers 1-4, or an aryl group of the carbon numbers 6-10.

[0023][as an example of -NAr_1Ar_2 in the case of forming nitrogen-containing heterocycle with the nitrogen atom which Ar_1 and Ar_2 have combined] N-carbazolyl machine, a 2-methyl N-carbazolyl machine, a 3-methyl N-carbazolyl machine, A 4-methyl N-carbazolyl machine, a 3-n-butyl N-carbazolyl machine, A 3-n-hexyl N-carbazolyl machine, a 3-n-octyl N-carbazolyl machine, 3, a 6-********- N-carbazolyl machine, 1, a 4-********- N-carbazolyl machine, 3, a 6-********- N-carbazolyl machine, a 2-methoxy N-carbazolyl machine, A 3-methoxy N-carbazolyl machine, a 3-ethoxy N-carbazolyl machine, A 3-isopropyloxy N-carbazolyl machine, a 3-n-butyloxy N-carbazolyl machine, A 3-n-hexyloxy N-carbazolyl machine, a 3-n-octyloxy N-carbazolyl machine, A 3-n-decyloxy carbazolyl machine, a 3-phenyl N-carbazolyl machine, 3-(4'-methylphenyl)- N-carbazolyl machine and 3-(4'-tert-buthylphenyl)- N-carbazolyl machine, 3, and a 6-diphenyl N-carbazolyl machine. [3-chloro N-carbazolyl machine] An N-benzo[a] carbazolyl machine, an N-benzo[b] carbazolyl machine, An N-benzo[c] carbazolyl machine, an N-a and dibenzo [i] carbazolyl machine, An N-b and dibenzo [h] carbazolyl machine, an N-c and dibenzo [g] carbazolyl machine, N-FENOKISAJINIIRU machine, a 2-methyl N-FENOKISAJINIIRU machine, A 2-chloro N-FENOKISAJINIIRU machine, a 2-fluoro N-FENOKISAJINIIRU machine, A 2-trifluoromethyl N-FENOKISAJINIIRU machine, N-FENOCHIAJINIIRU machine, A 2-methyl N-FENOCHIAJINIIRU machine, a 2-chloro N-FENOCHIAJINIIRU machine, A 2-fluoro N-FENOCHIAJINIIRU machine, a 2-trifluoromethyl N-FENOCHIAJINIIRU machine, N-AKURIDANIRU machine, an N-b and dibenzo [f] AZEPINIRU machine, a 2-methyl N-b and dibenzo [f] AZEPINIRU machine, A 3-methyl N-b and dibenzo [f] AZEPINIRU machine, a 4-methyl N-b and dibenzo [f] AZEPINIRU machine, A 2-trifluoromethyl N-b and dibenzo [f] AZEPINIRU machine, a 3-trifluoromethyl N-b and dibenzo [f] AZEPINIRU machine, a 3-n-butyl N-b and dibenzo [f] AZEPINIRU machine, A 3-n-hexyl N-b and dibenzo [f] AZEPINIRU machine, a 3-n-octyl N-b and dibenzo [f] AZEPINIRU machine, A 3-n-******- N-b and dibenzo [f] AZEPINIRU machine, 3, a 6-********- N-b and dibenzo [f] AZEPINIRU machine, A 2-methoxy N-b and dibenzo [f] AZEPINIRU machine, a 3-methoxy N-b and dibenzo [f] AZEPINIRU machine, A 3-ethoxy N-b and dibenzo [f] AZEPINIRU machine, a 3-isopropyloxy N-b and dibenzo [f] AZEPINIRU machine, A 3-n-butyloxy N-b and dibenzo [f] AZEPINIRU machine, a 3-n-octyloxy N-b and dibenzo [f] AZEPINIRU machine, A 3-n-decyloxy N-b and dibenzo [f] AZEPINIRU machine, a 3-phenyl N-b and dibenzo [f] AZEPINIRU machine, 3-(4'-methylphenyl)- an N-b and dibenzo [f] AZEPINIRU machine. b, a 2-chloro N-dibenzo [f] AZEPINIRU machine, b and a 3-chloro N-dibenzo [f] AZEPINIRU machine, 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, the 2-methyl 10, b, an 11-dihydroN-dibenzo [f] AZEPINIRU machine, The 3-methyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 4-methyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 2-

trifluoromethyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 3-trifluoromethyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 3-n-butyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 3-n-hexyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 3-n-octyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, 3-n-******- 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, 3, 6-********- 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, 2 - methoxy -- 10 and an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine. 3 - methoxy -- 10, b and an 11-dihydroN-dibenzo [f] AZEPINIRU machine, 3-ethoxy 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, the 3-isopropyloxy 10, and an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine. The 3-n-butyloxy 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 3-n-octyloxy 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, 3-n-decyloxy 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 3-phenyl 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, 3-(4'-methylphenyl)-10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, The 2-chloro 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, the 3-chloro 10, an 11-dihydroN-b and dibenzo [f] AZEPINIRU machine, etc. can be mentioned.

[0024]Z_1 and Z_2 in the compound denoted by a general formula (1) A hydrogen atom, The amino group which is not replaced [the aralkyl group which is not replaced / the aryl group which is not replaced / a halogen atom, a straight chain, branching or an annular alkyl group, a straight chain, branching or an annular alkoxy group substitution, or /, substitution, or /, substitution, or] is expressed. In the compound denoted by a general formula (1), the aryl group and aralkyl group of Z_1 and Z_2 may have a substituent, A halogen atom, the straight chain of the carbon numbers 1-16, branching, or an annular alkyl group, substituents, such as the straight chain of the carbon numbers 1-16, branching or an annular alkoxy group, an aryl group of the carbon numbers 3-25, an aralkyl group of the carbon numbers 5-16, an N-mono-substitution amino group of the carbon numbers 1-20, the carbon numbers 2-40N, and N-JI substitution amino group, -- single substitution -- or it may be many replaced. In the compound denoted by a general formula (1), [the amino group of Z_1 and Z_2] it may have a substituent -- substituents, such as an alkyl group of the carbon numbers 1-20, an aryl group of the carbon numbers 3-20, or an aralkyl group of the carbon numbers 4-20, -- single -- it may replace or JI replace

[0025]Preferably Z_1 and Z_2 A hydrogen atom, a halogen atom, The straight chain of the carbon numbers 1-16, branching or an annular alkyl group, the straight chain of the carbon numbers

1-16, The carbocyclic aromatic series machine which is not replaced [the substitution of branching or an annular alkoxy group and the carbon numbers 6-25, or], The aralkyl group which is not replaced [the substitution of the heterocyclic aromatic series machine which is not replaced / the substitution of the carbon numbers 3-25, or /, and the carbon numbers 5-16, or], Are an unreplaced amino group or a substitution amino group of the carbon numbers 1-24, and more preferably, A hydrogen atom, a halogen atom, the straight chain of the carbon numbers 1-10, branching, or an annular alkyl group, The carbocyclic aromatic series machine which is not replaced [the substitution of the straight chain of the carbon numbers 1-10, branching or an annular alkoxy group, and the carbon numbers 6-12, or], Are an aralkyl group which is not replaced [the substitution of the heterocyclic aromatic series machine which is not replaced / the substitution of the carbon numbers 4-12, or /, and the carbon numbers 7-12, or], or a substitution amino group of the carbon numbers 1-20, and still more preferably, The heterocyclic aromatic series machine which is not replaced [the substitution of the carbocyclic aromatic series machine which is not replaced / the substitution of a hydrogen atom, a halogen atom, the straight chain of the carbon numbers 1-8, branching or an annular alkyl group, the straight chain of the carbon numbers 1-8, branching or an annular alkoxy group, and the carbon numbers 6-10, or /, and the carbon numbers 4-10, or], They are an aralkyl group which is not replaced [the substitution of the carbon numbers 7-10 or], or a substitution amino group of the carbon numbers 1-20.

[0026][as an example of the basis of Z_1 and Z_2] Halogen atoms, such as a hydrogen atom, a fluorine atom, a chlorine atom, and a bromine atom. For example, the straight chain quoted as an example of R1-R3, branching, or an annular alkyl group, A methoxy group, an ethoxy basis, n-propoxy group, an isopropoxy group, an n-butoxy machine, An iso butoxy machine, a sec-butoxy machine, an n-pentyloxy machine, a neo pentyloxy machine, Cyclopenthyloxy machine, n-hexyloxy machine, 3, and 3-JIMECHIRU butyloxy machine, 2-ethyl butyloxy machine, a cyclohexyloxy machine, n-heptyloxy machine, n-octyloxy machine, 2-ethylhexyloxy machine, n-nonyloxy machine, An n-decyloxy machine, n-undecyloxy machine, n-dodecyloxy machine, Straight chains, such as n-bird decyloxy machine, an n-tetra-decyloxy machine, an n-pentadecyl OKISHI machine, an n-hexadecyl OKISHI machine, an n-hepta-decyloxy machine, n-octadecyloxy machine, and n-eicosyl OKISHI machine, branching, or an annular alkoxy group,

[0027]For example, the heterocyclic aromatic series machine quoted as an example of R1-R3 which is not replaced [the carbocyclic aromatic series machine which is not replaced /

substitution or / and substitution, or], The aralkyl group which is not replaced [substitution or], an amino group, N-methylamino machine, N-ethylamino machine, a N-n-butylamino machine, N-cyclohexylamino machine, A N-n-octyl amino group, a N-n-DESHIRU amino group, N-benzylamino machine, N-phenylamino machine, N-(3-methylphenyl) amino group, N-(4-methylphenyl) amino group, N-(4-n-buthylphenyl) amino group, N-(4-methoxypheny) amino group, N-(3-fluoro phenyl) amino group, N-(4-chlorophenyl) amino group, N-(1-Naff Chill) amino group, N-(2-Naff Chill) amino group, N, and N-dimethylamino group, An N and N-diethylamino machine, N, and N-G n-butylamino machine, N, and N-G n-hexylamino machine, An N and N-di-n-octyl amino group, N, and N-G n-DESHIRU amino group, N, and N-G n-dodecylamino machine, an N-methyl N-ethylamino machine, an N-ethyl N-n-butylamino machine, an N-methyl N-phenylamino machine, a N-n-butyl N-phenylamino machine, N and N-diphenylamino machine, N, and N-JI (3 methylphenyl) amino group, N and N-JI (4-methylphenyl) amino group, N, and N-JI (4-ethyl phenyl) amino group, N and N-JI (4-tert-buthylphenyl) amino group, N, and N-JI (4-n-hexyl phenyl) amino group, N and N-JI (4-methoxypheny) amino group, N, and N-JI (4-ethoxy phenyl) amino group, N and N-JI (4-n-butyloxy phenyl) amino group, N, and N-JI (4-n-hexyloxy phenyl) amino group, N and N-JI (1-Naff Chill) amino group, N, and N-JI (2-Naff Chill) amino group, An N-phenyl N-(3-methylphenyl) amino group, an N-phenyl N-(4-methylphenyl) amino group, An N-phenyl N-(4-octyl phenyl) amino group, an N-phenyl N-(4-methoxypheny) amino group, An N-phenyl N-(4-ethoxy phenyl) amino group, an N-phenyl N-(4-n-hexyloxy phenyl) amino group, An N-phenyl N-(4-fluoro phenyl) amino group, an N-phenyl N-(1-Naff Chill) amino group, an N-phenyl N-(2-Naff Chill) amino group, The amino group etc. which is not replaced [substitution, such as an N-phenyl N-(4-phenyl phenyl) amino group, or] can be mentioned.

[0028]If it is the feature to carry out kind use of the compound denoted by a general formula (1) at least in the organic electroluminescence element of this invention, for example, the compound denoted by a general formula (1) is used as a luminescence ingredient and used for a luminous layer, It becomes possible to provide the organic electroluminescence element which emits light to the blue which was excellent in endurance with high-intensity - blue-green which are not in the former.

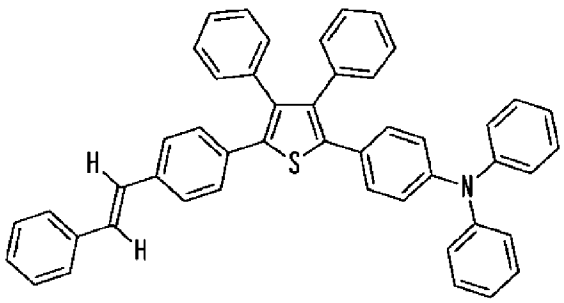
[0029]If a luminous layer is formed in combination with other luminescence ingredients, it will become possible to also provide the organic electroluminescence element which was excellent in endurance with high-intensity and which emits light white.

[0030][as an example of a compound denoted by the general formula (1) concerning this invention] Although the compound of A-1 to A-21 of the following, B-1 to B-18, C-1 to C-18, D-1 to D-18, E-1 to E-24, F1-F24, G1-G21, H1-H18, and I-1 to I-24 can be mentioned, this invention is not limited to these.

[0031]

[Chemical formula 6]

A-1



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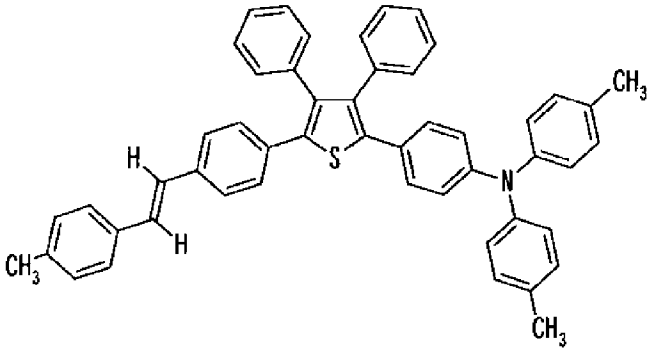

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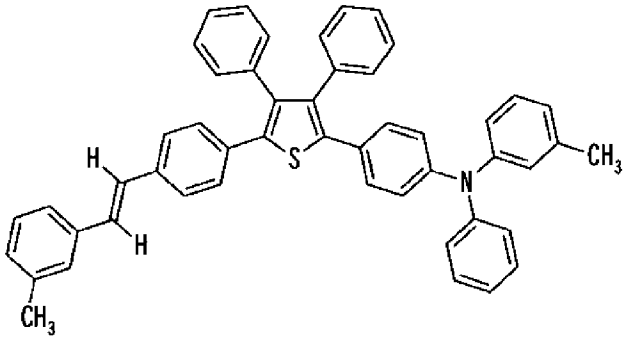
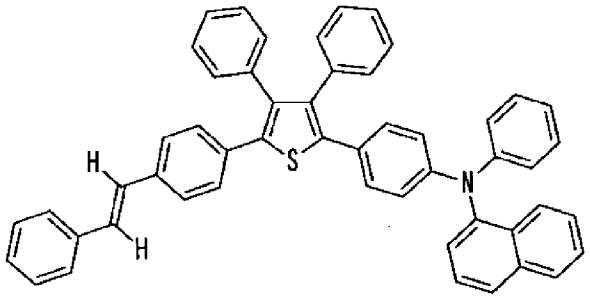


[0032]

[Chemical formula 7]

A-4



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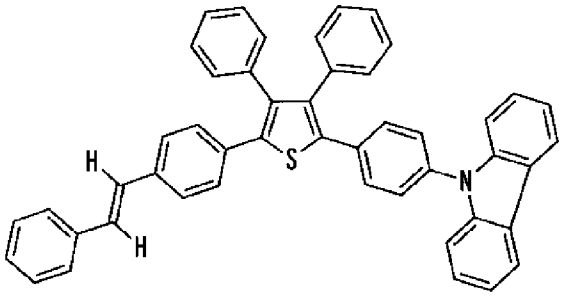

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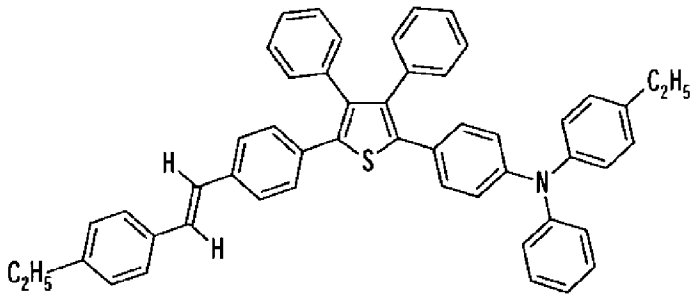
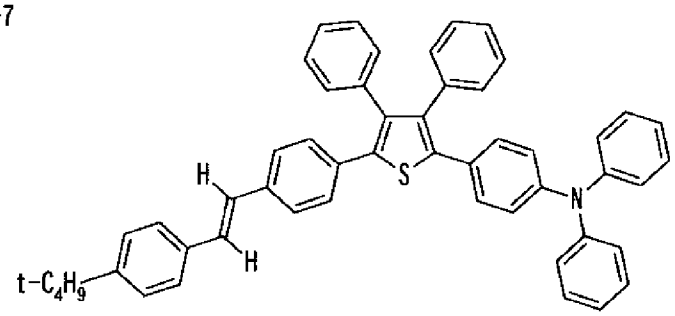


[0033]

[Chemical formula 8]

A-7



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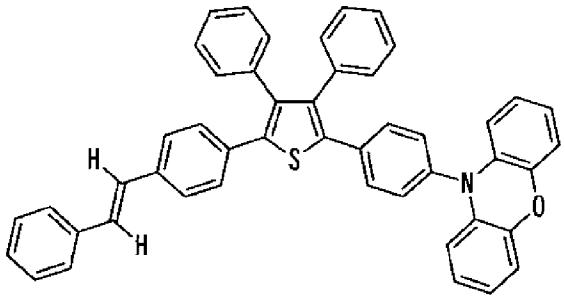

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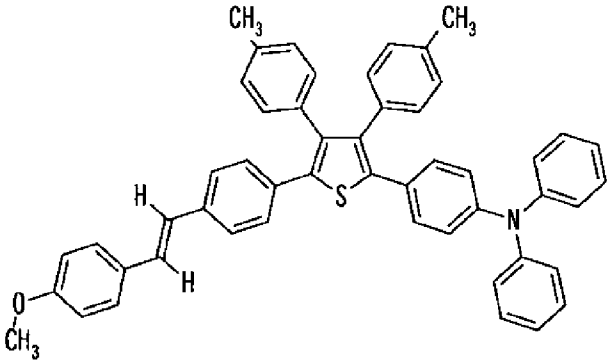
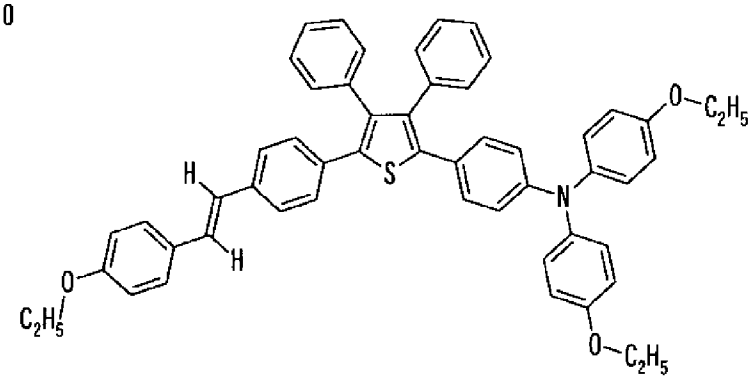


[0034]

[Chemical formula 9]

A-10



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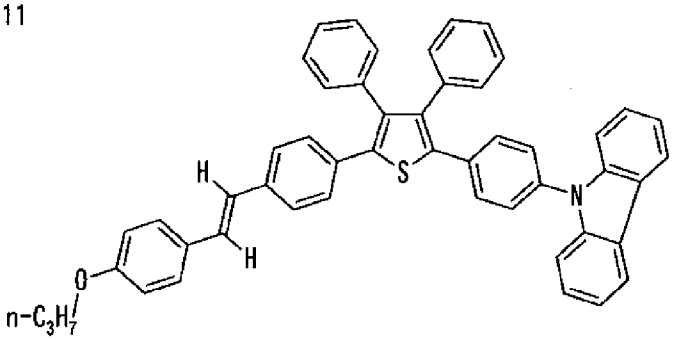

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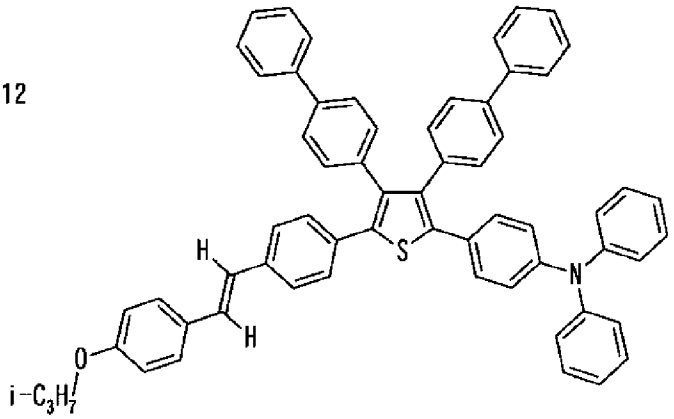
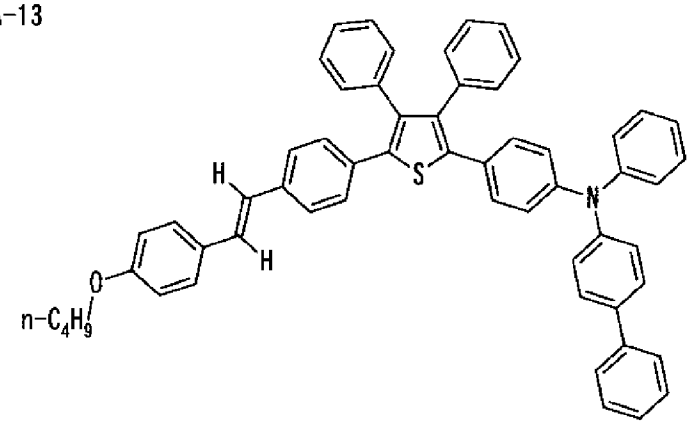


[0035]

[Chemical formula 10]

A-13



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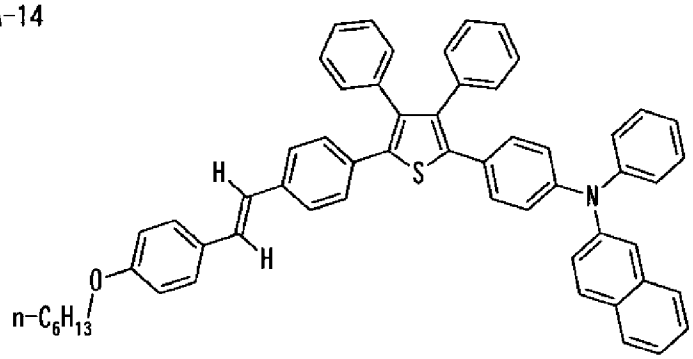

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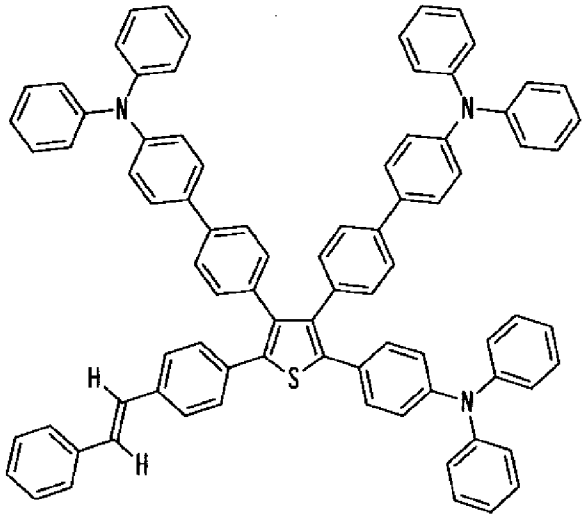
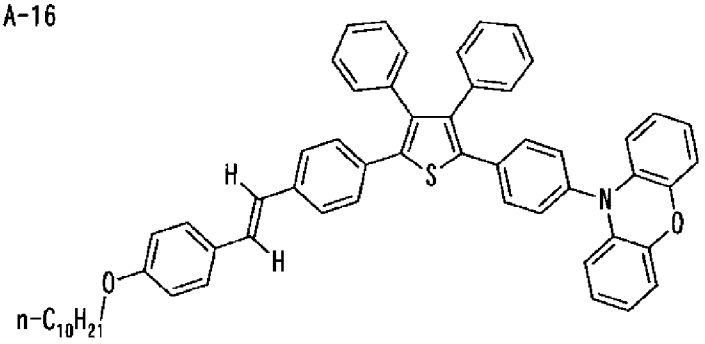


[0036]

[Chemical formula 11]

A-16



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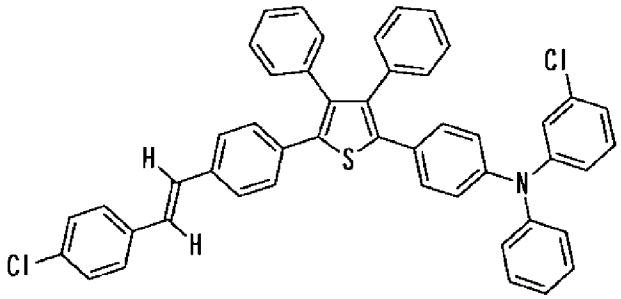

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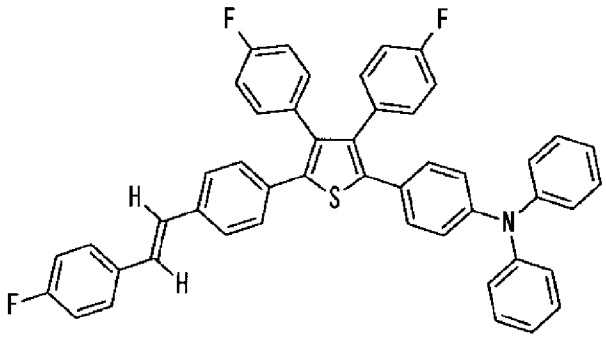
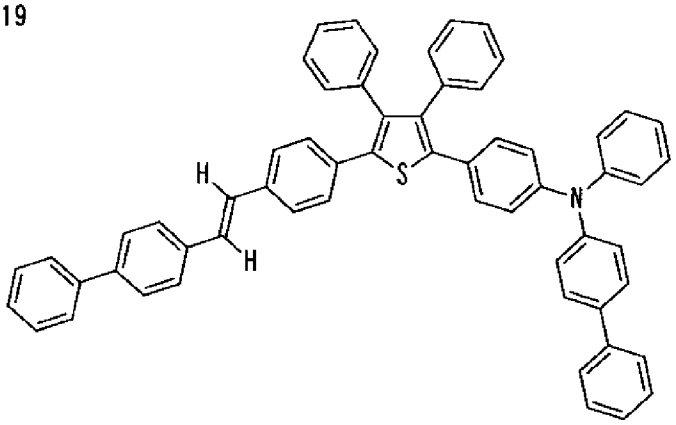


[0037]

[Chemical formula 12]

A-19



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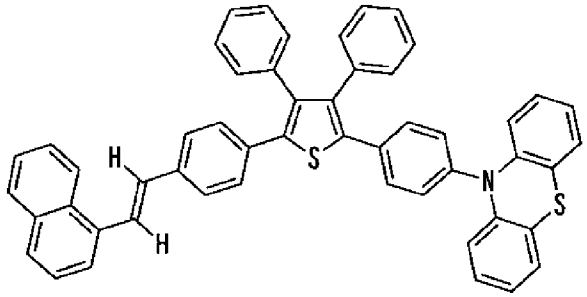

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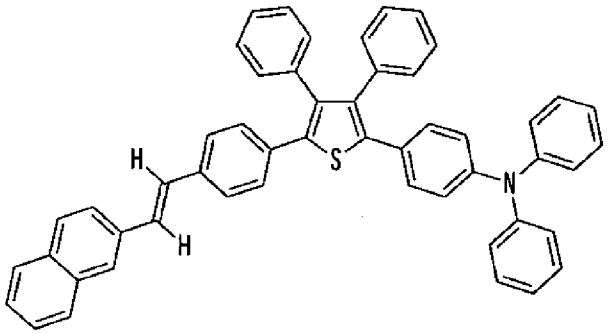
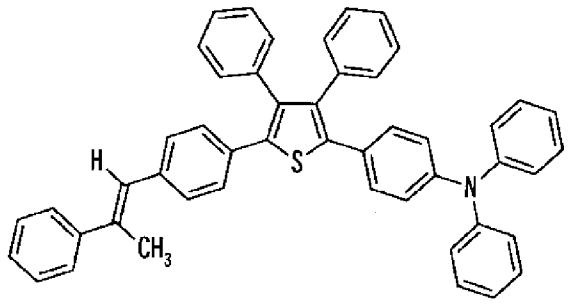


[0038]

[Chemical formula 13]

B-1



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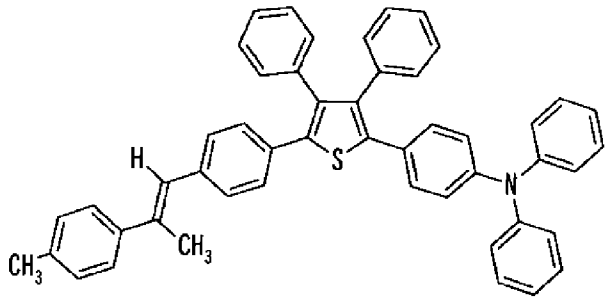

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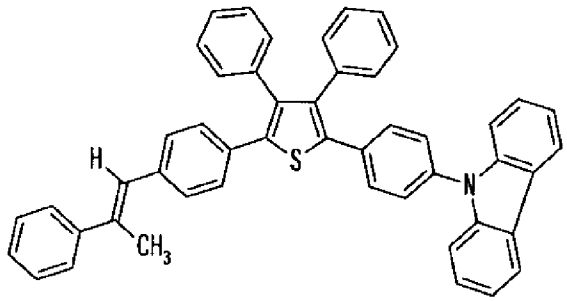
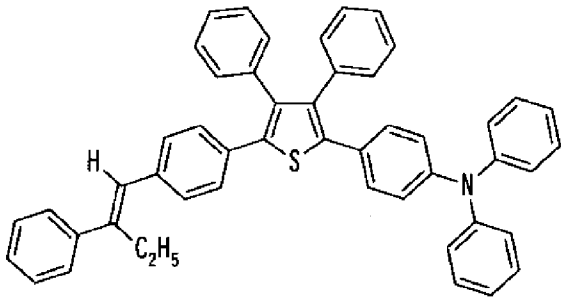


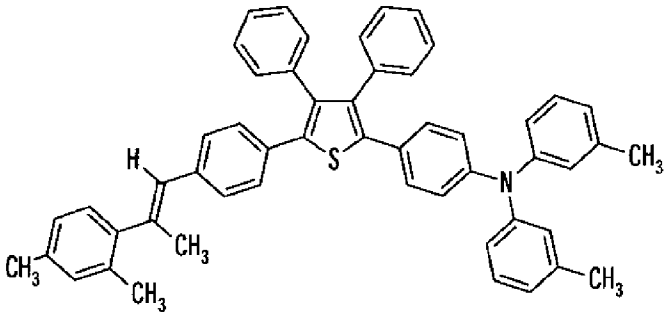
[0039]

[Chemical formula 14]

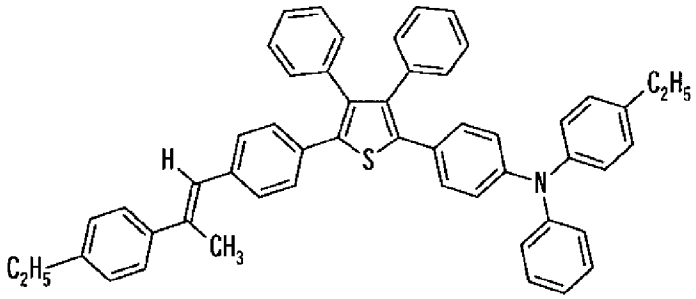
B-4



B-5



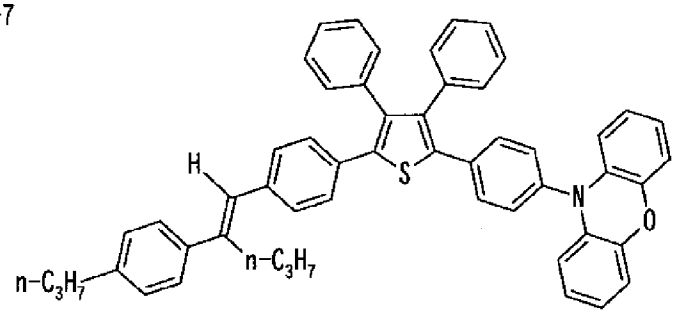
B-6



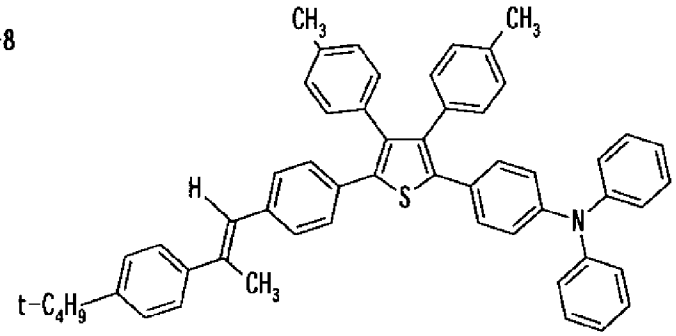
[0040]

[Chemical formula 15]

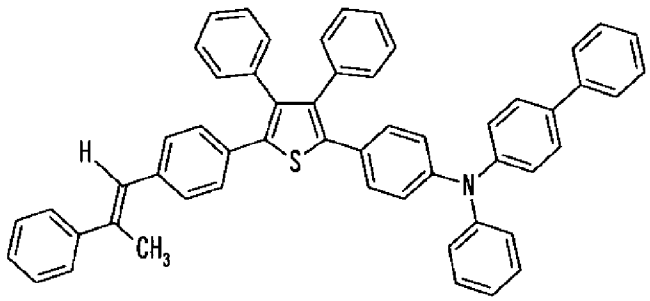
B-7



B-8



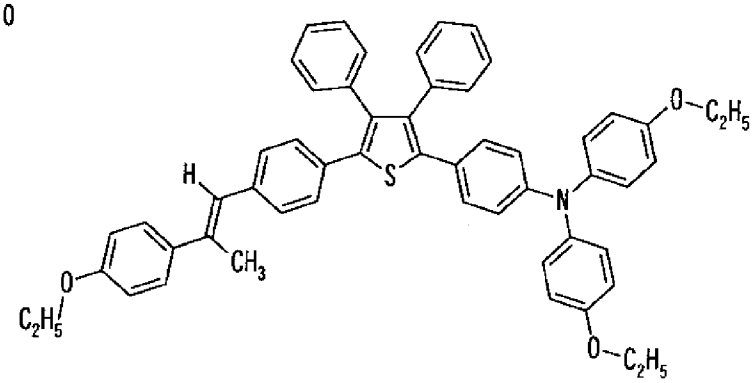
B-9



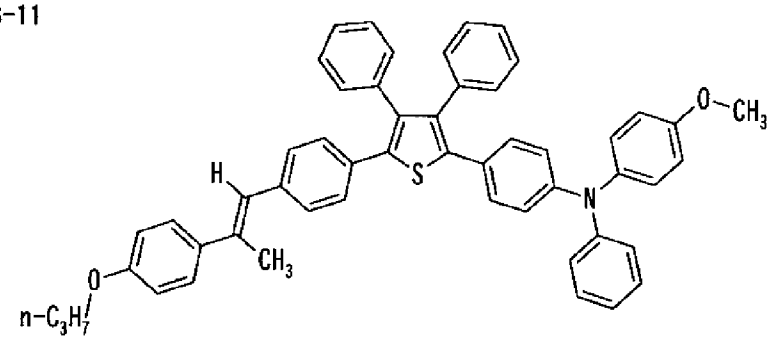
[0041]

[Chemical formula 16]

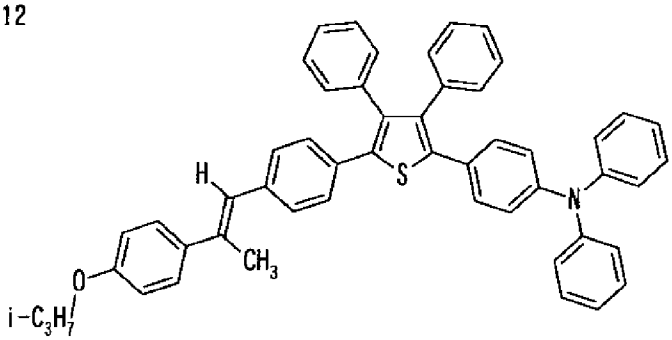
B-10



B-11



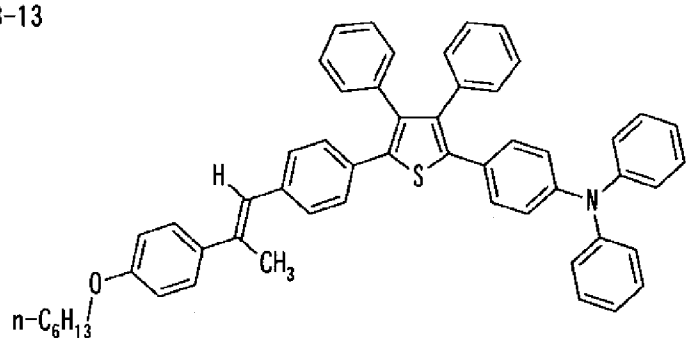
B-12



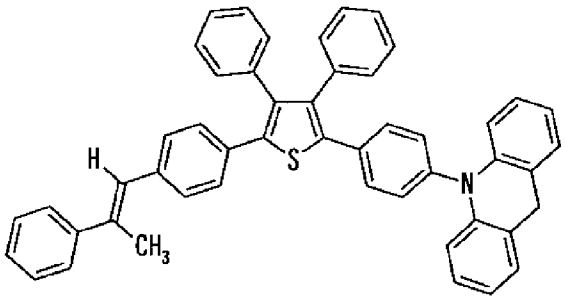
[0042]

[Chemical formula 17]

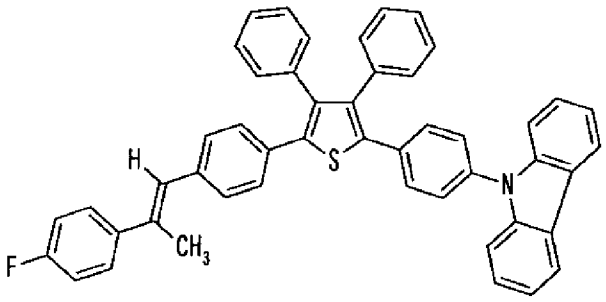
B-13



B-14



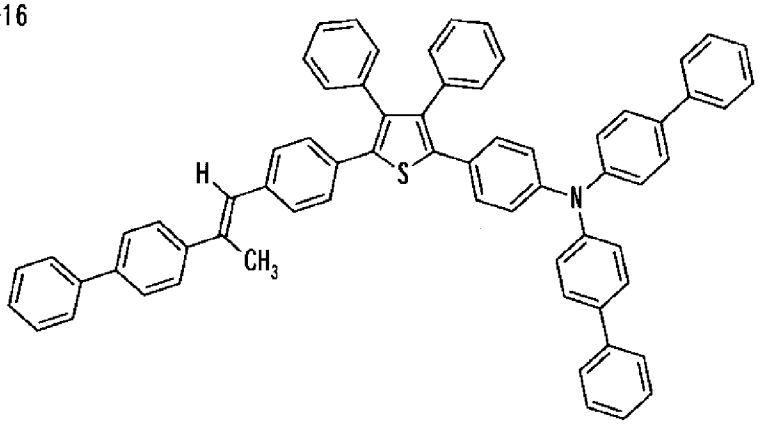
B-15



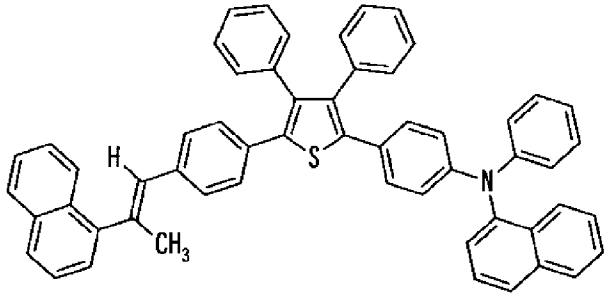
[0043]

[Chemical formula 18]

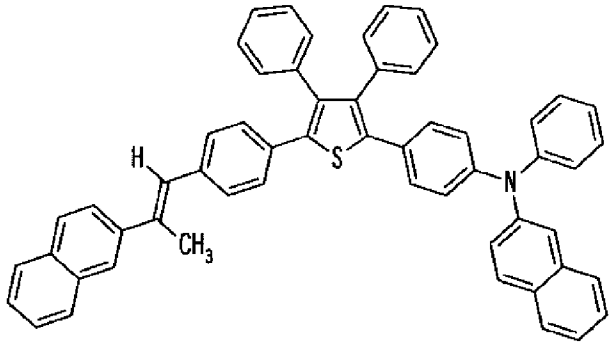
B-16



B-17



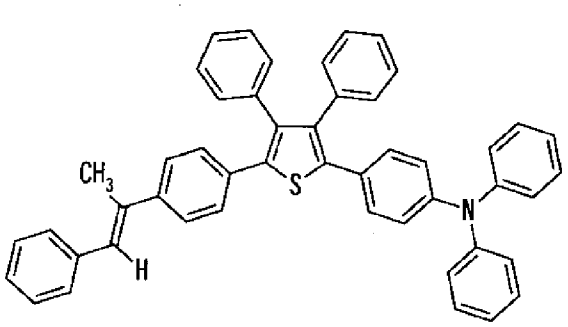
B-18



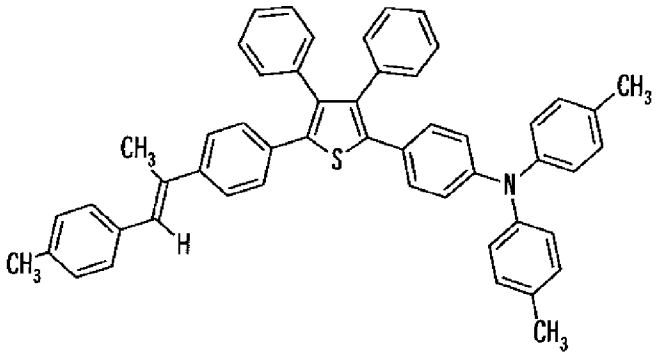
[0044]

[Chemical formula 19]

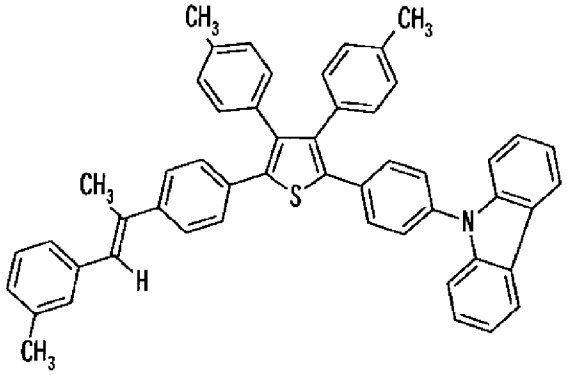
C-1



C-2



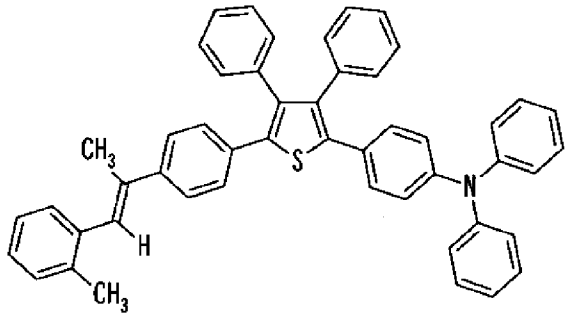
C-3



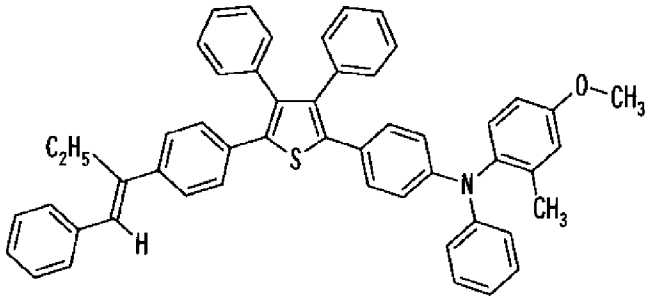
[0045]

[Chemical formula 20]

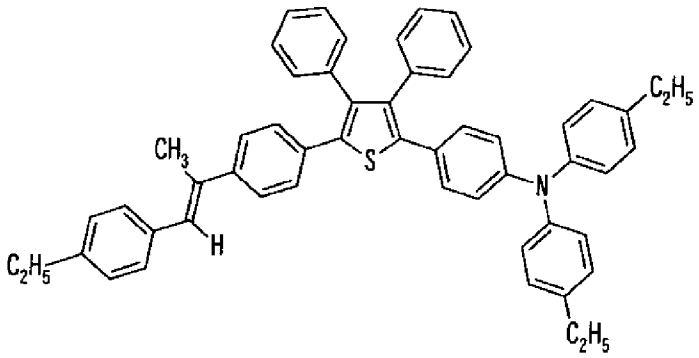
C-4



C-5



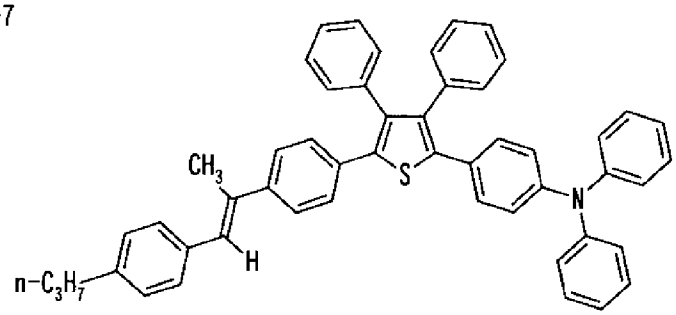
C-6



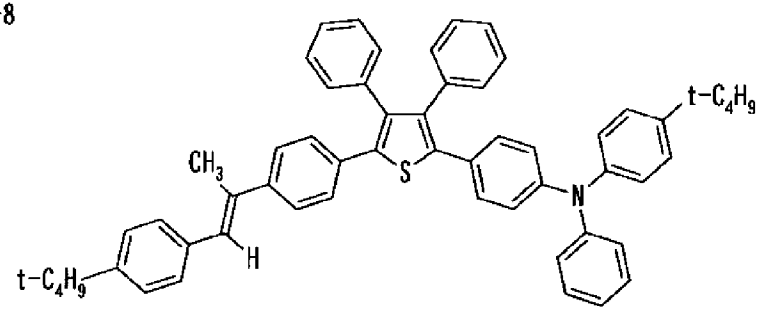
[0046]

[Chemical formula 21]

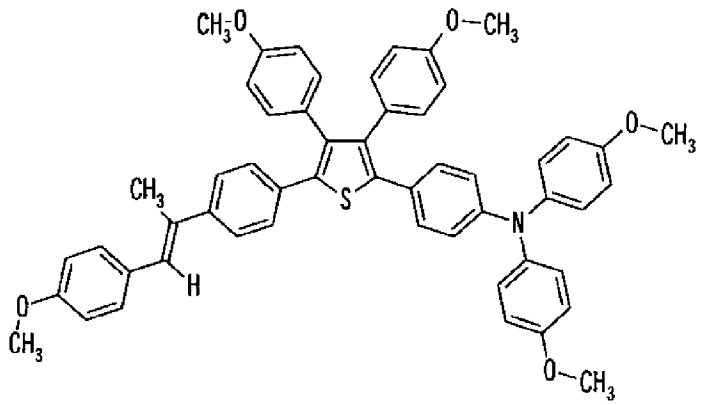
C-7



C-8



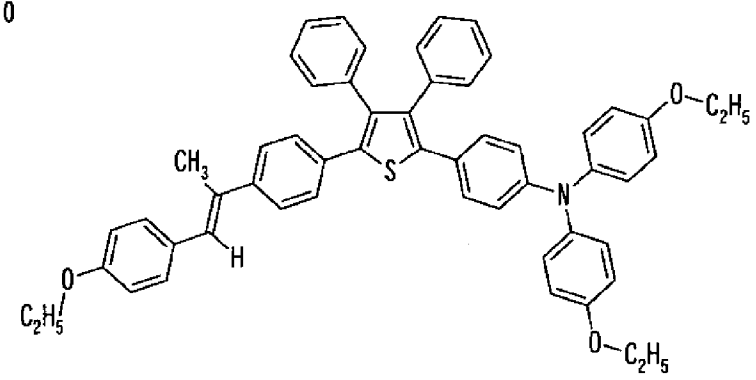
C-9



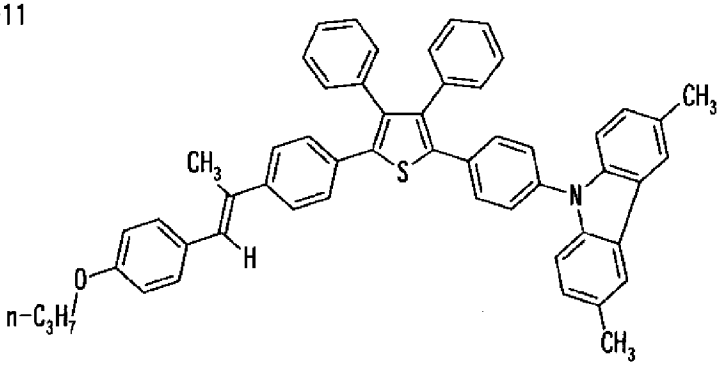
[0047]

[Chemical formula 22]

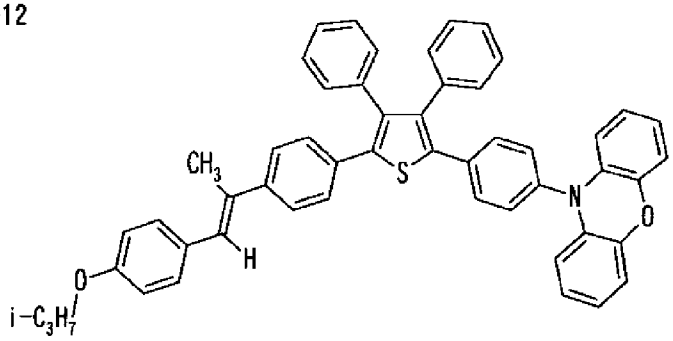
C-10



C-11



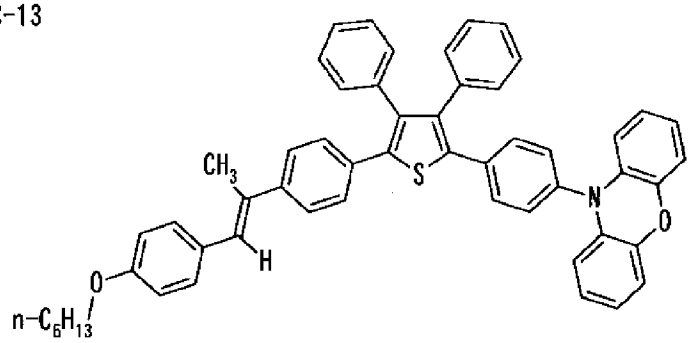
C-12



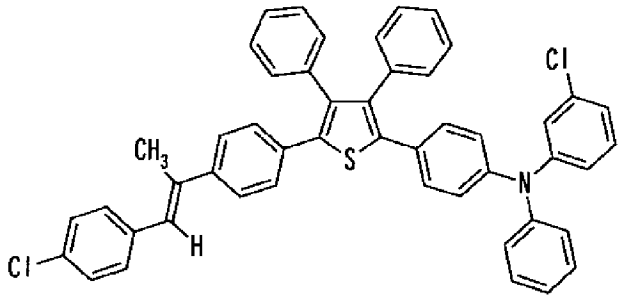
[0048]

[Chemical formula 23]

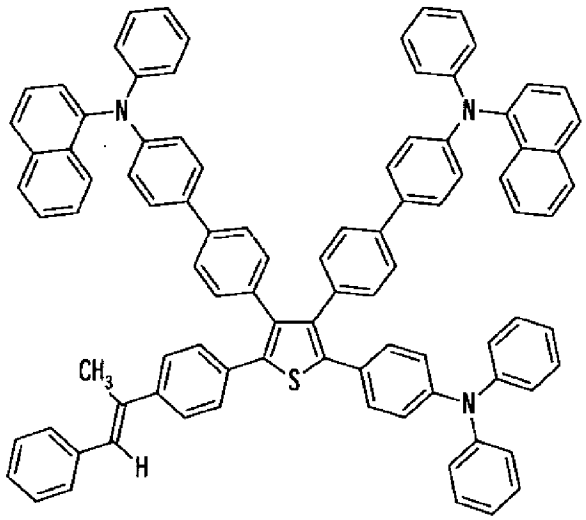
C-13



C-14



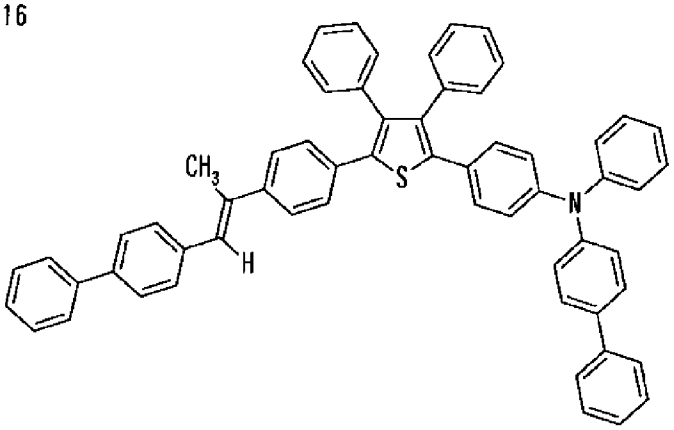
C-15



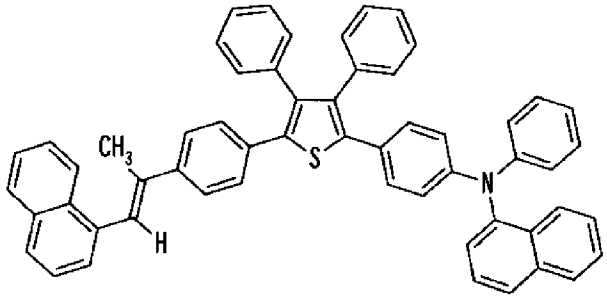
[0049]

[Chemical formula 24]

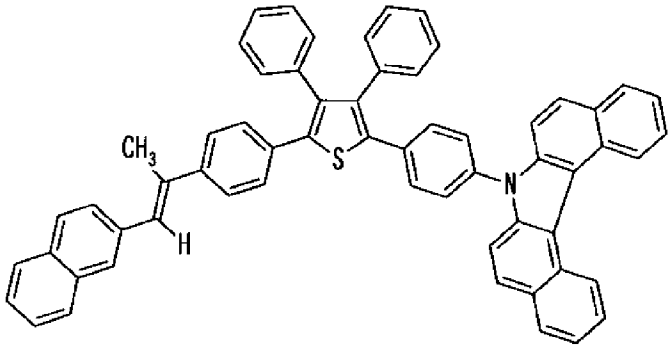
C-16



C-17



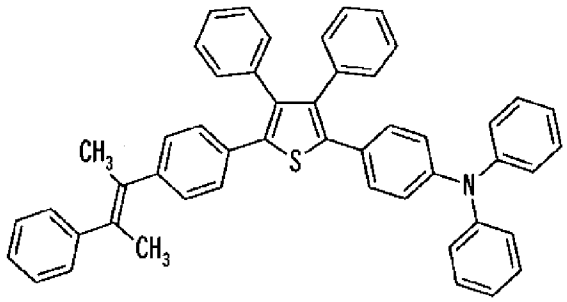
C-18



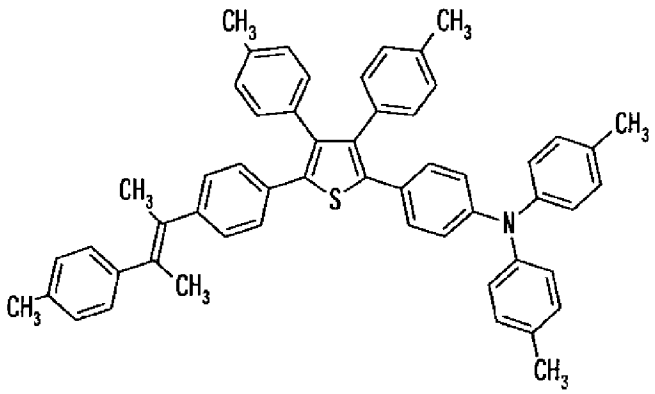
[0050]

[Chemical formula 25]

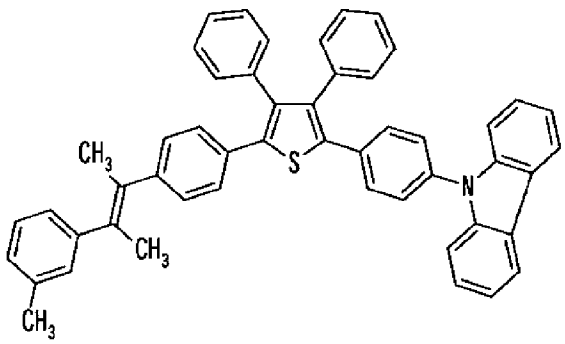
D-1



D-2



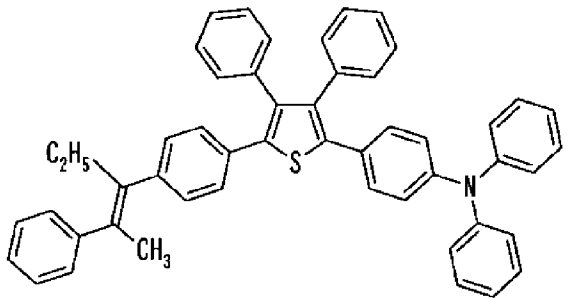
D-3



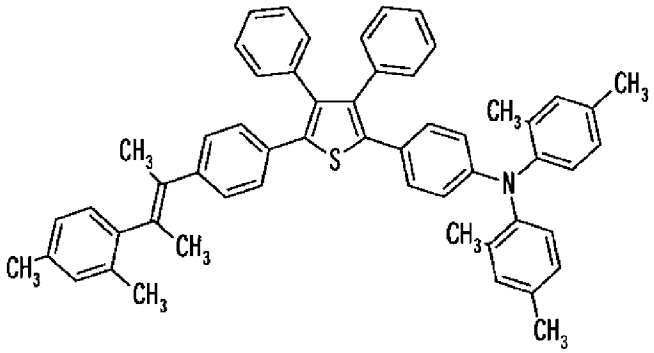
[0051]

[Chemical formula 26]

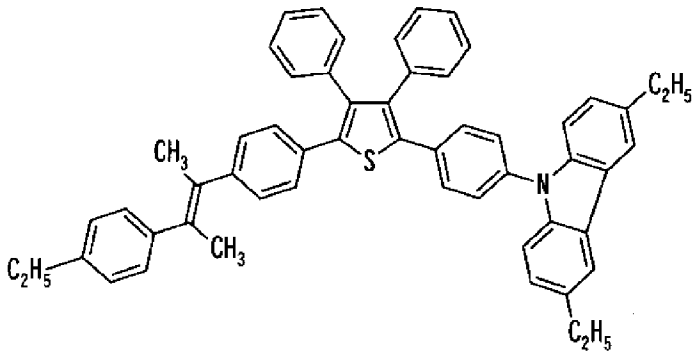
D-4



D-5



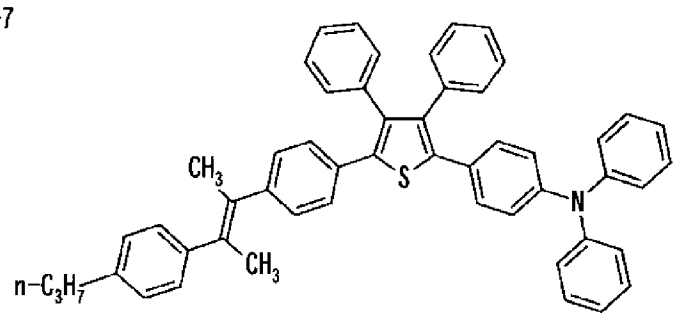
D-6



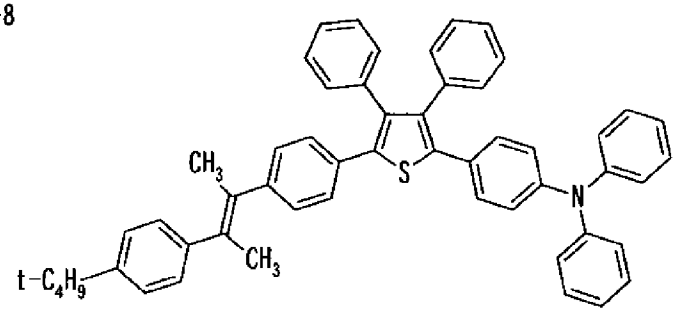
[0052]

[Chemical formula 27]

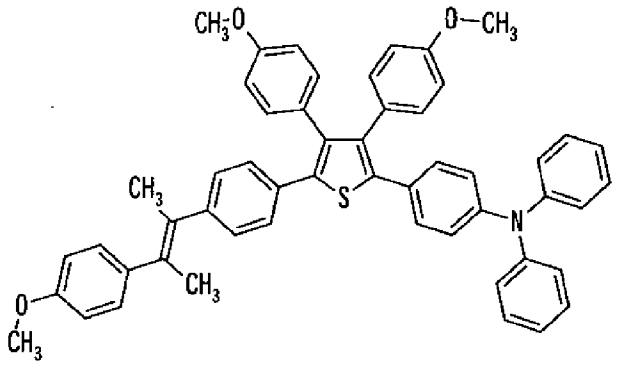
D-7



D-8



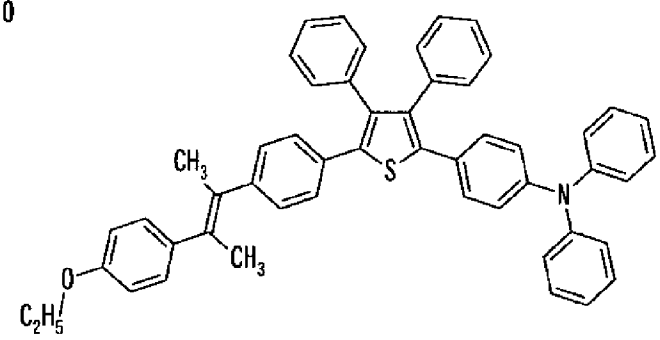
D-9



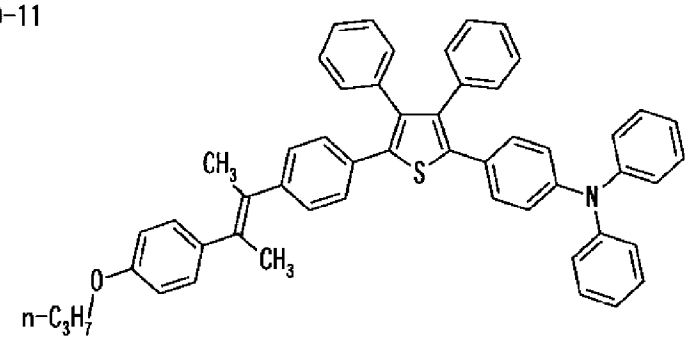
[0053]

[Chemical formula 28]

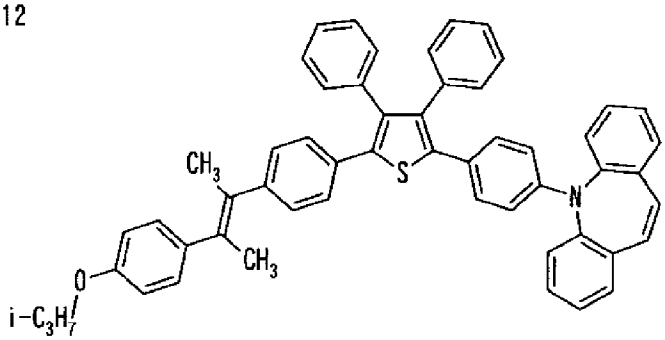
D-10



D-11



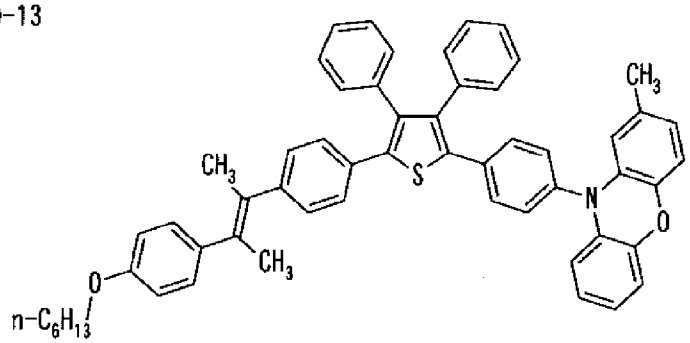
D-12



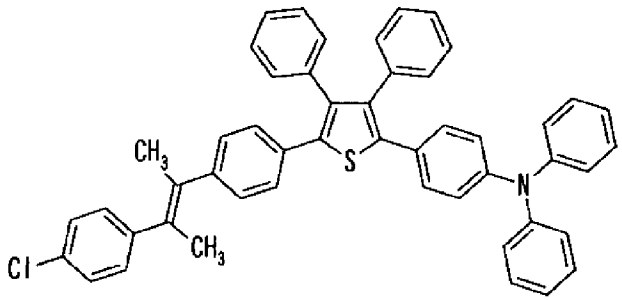
[0054]

[Chemical formula 29]

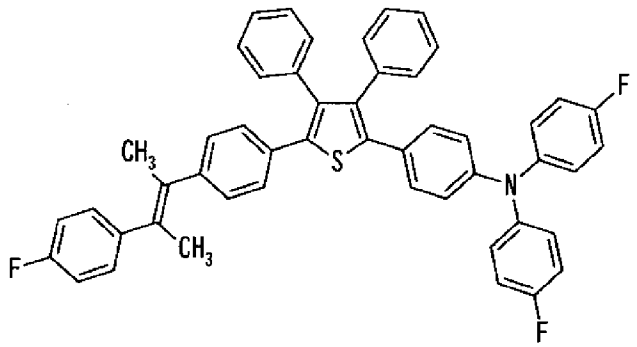
D-13



D-14



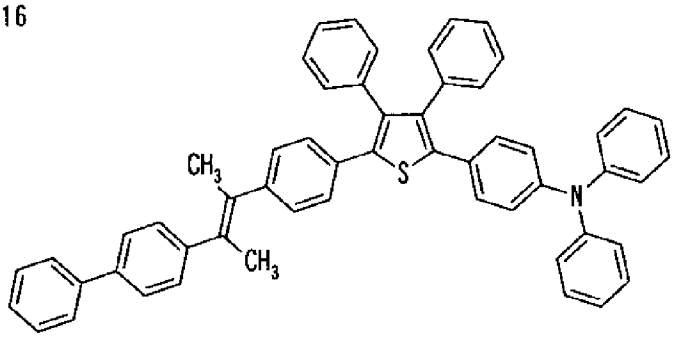
D-15



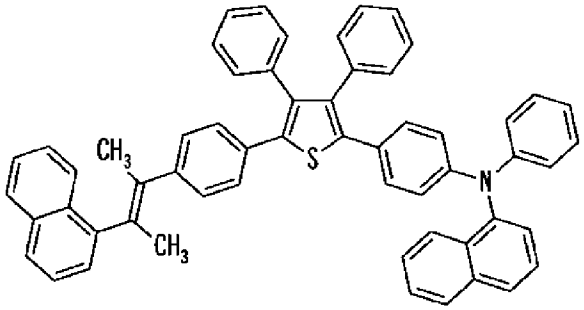
[0055]

[Chemical formula 30]

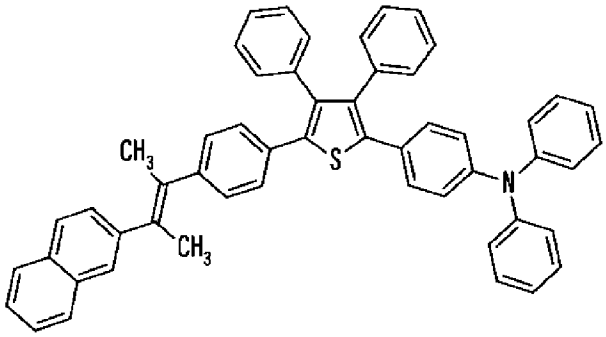
D-16



D-17



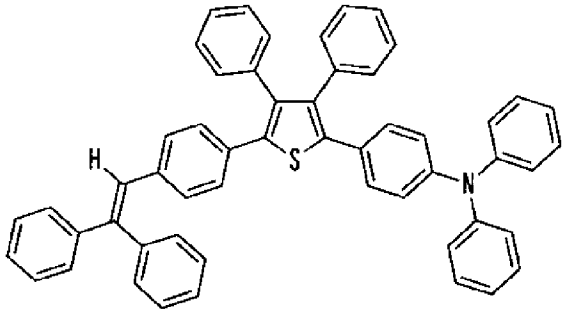
D-18



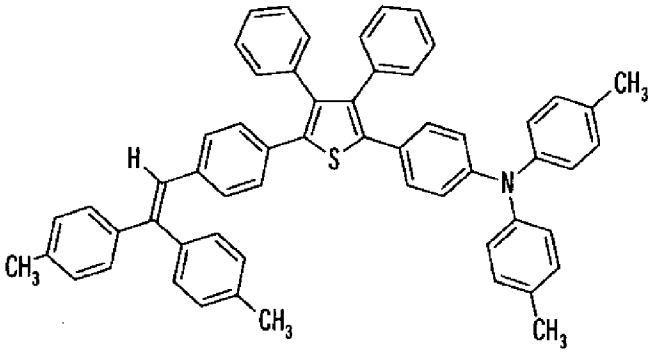
[0056]

[Chemical formula 31]

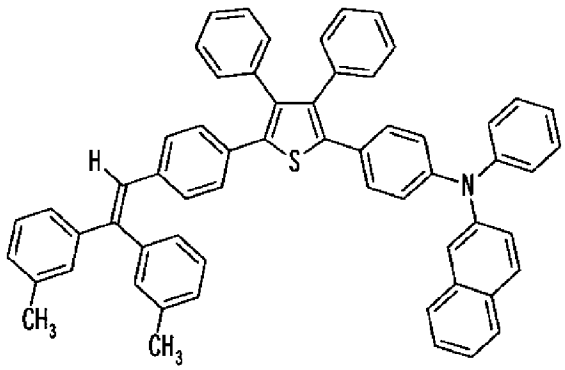
E-1



E-2



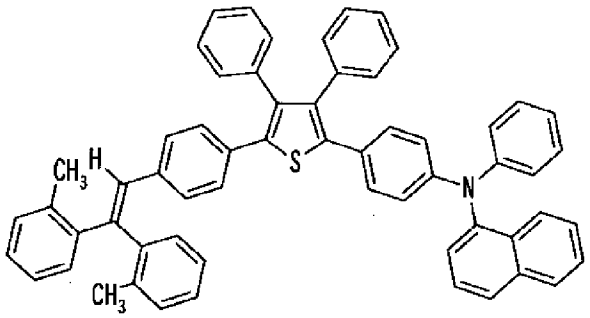
E-3



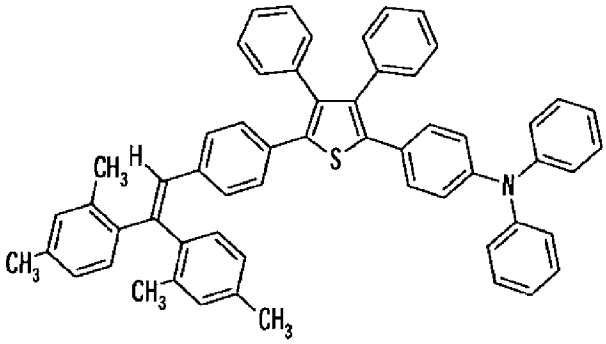
[0057]

[Chemical formula 32]

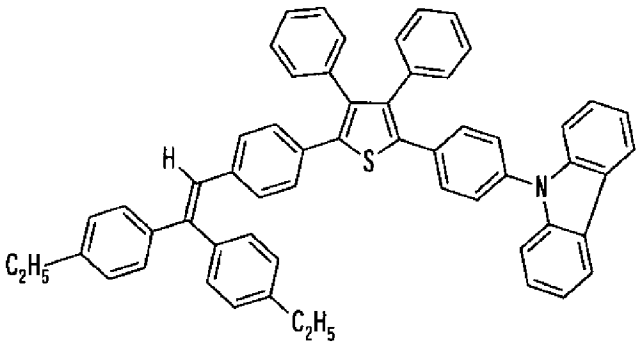
E-4



E-5



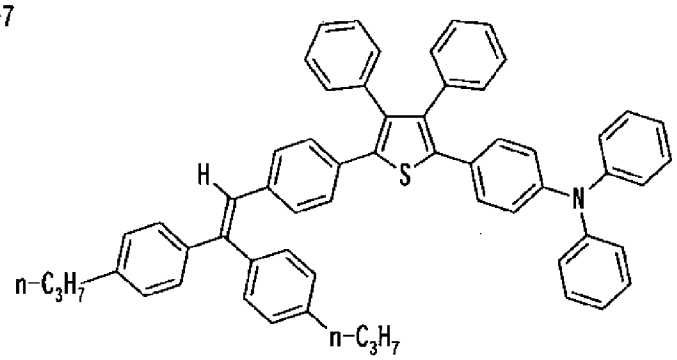
E-6



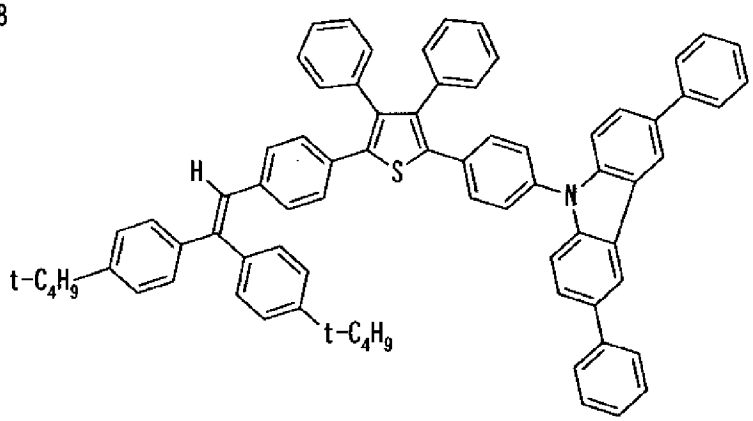
[0058]

[Chemical formula 33]

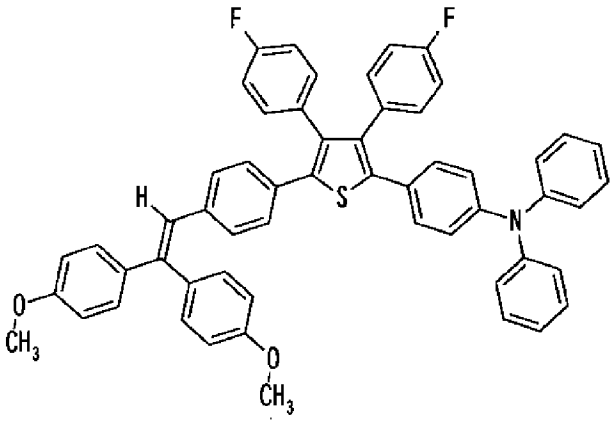
E-7



E-8



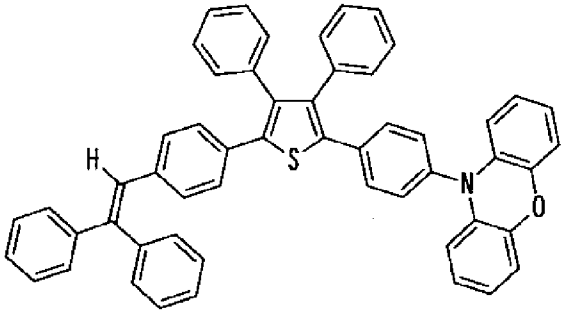
E-9



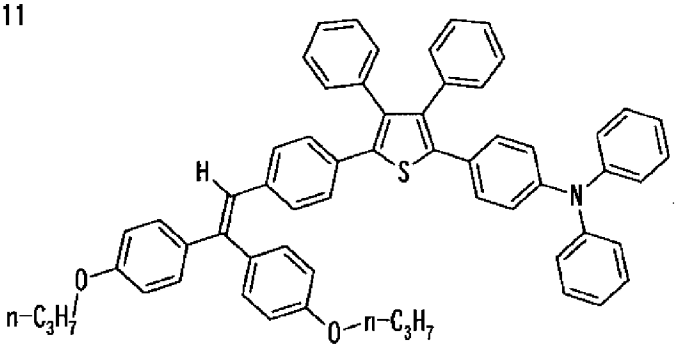
[0059]

[Chemical formula 34]

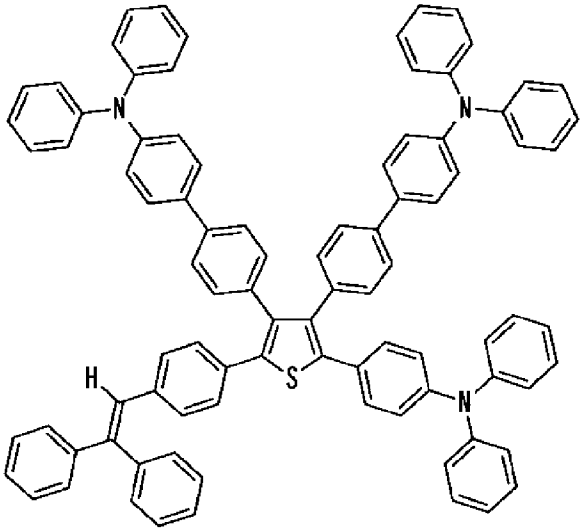
E-10



E-11



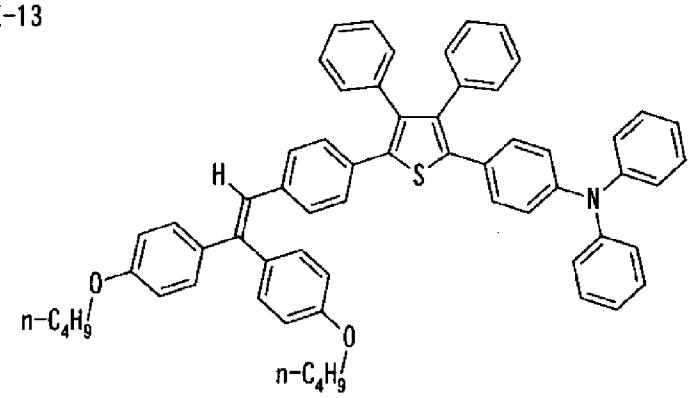
E-12



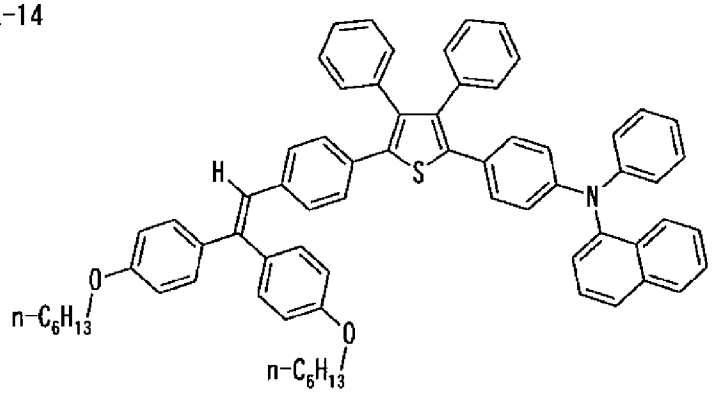
[0060]

[Chemical formula 35]

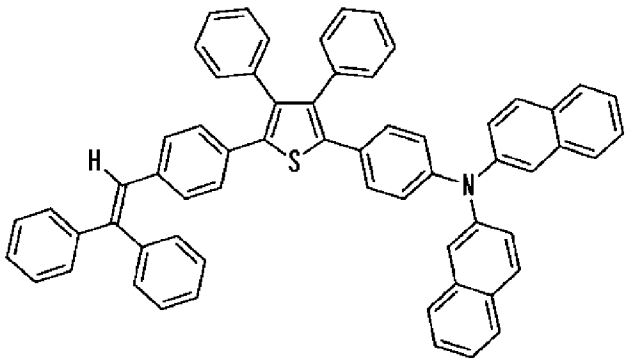
E-13



E-14



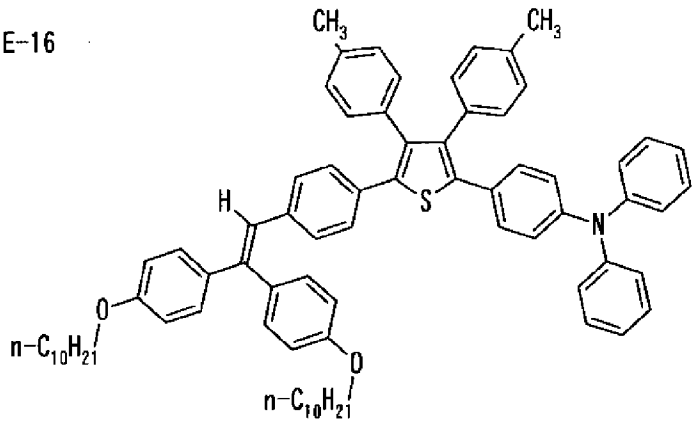
E-15



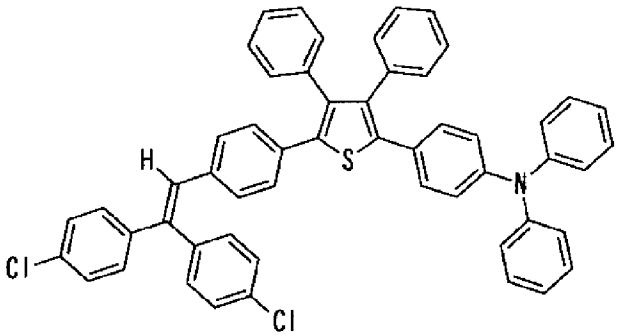
[0061]

[Chemical formula 36]

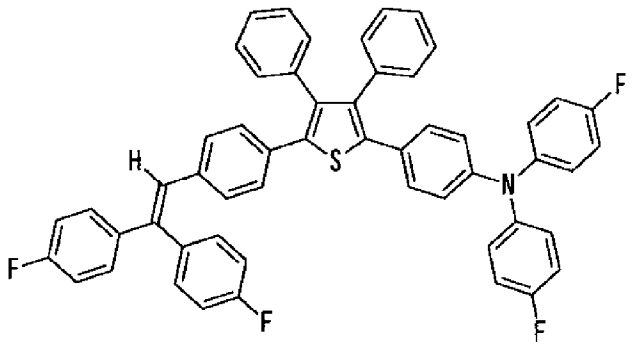
E-16



E-17



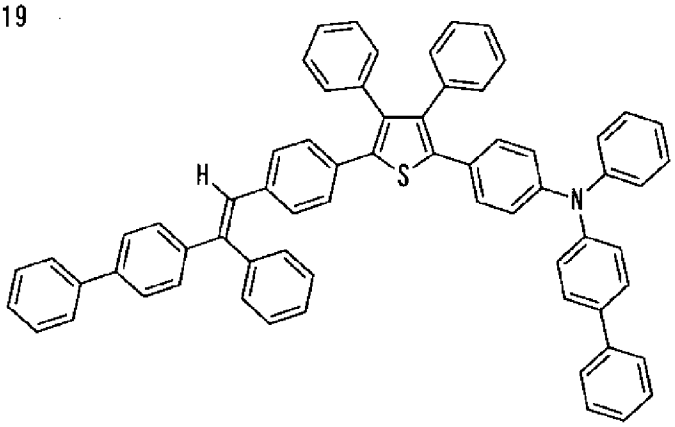
E-18



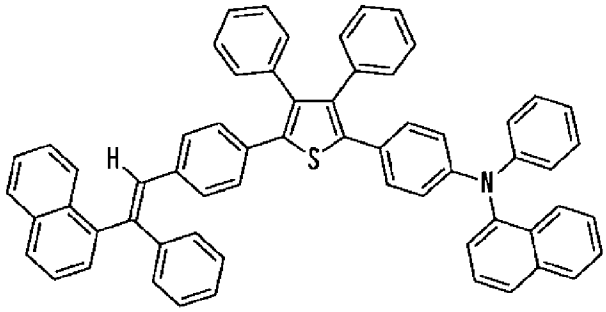
[0062]

[Chemical formula 37]

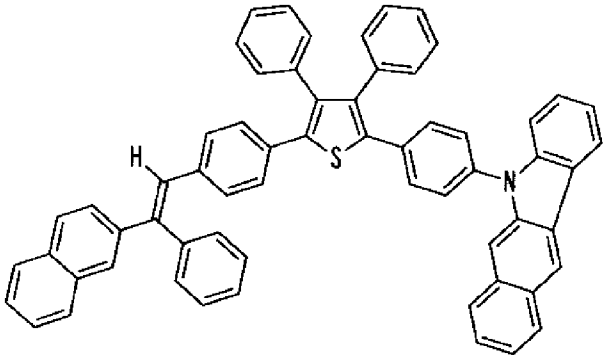
E-19



E-20



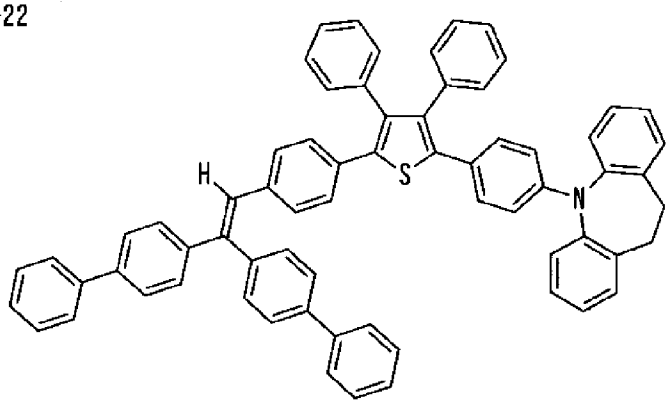
E-21



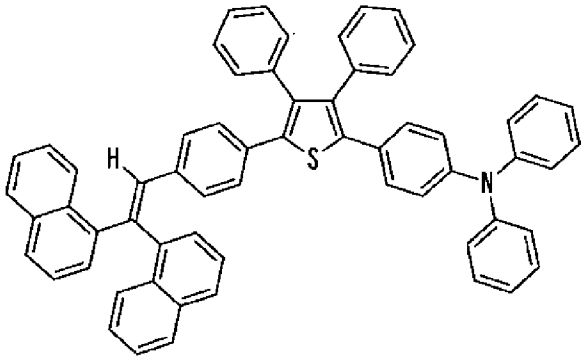
[0063]

[Chemical formula 38]

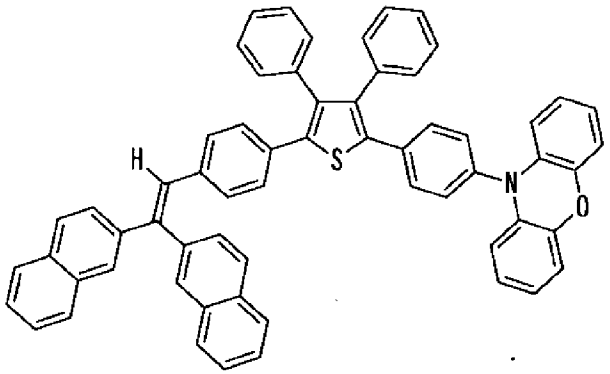
E-22



E-23



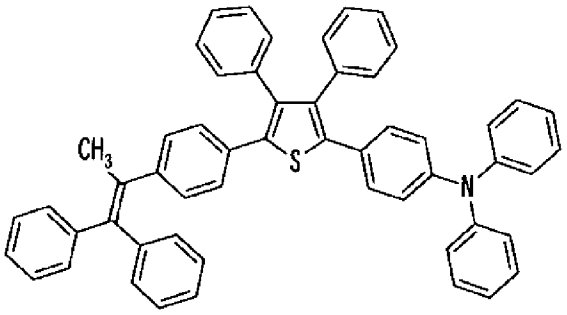
E-24



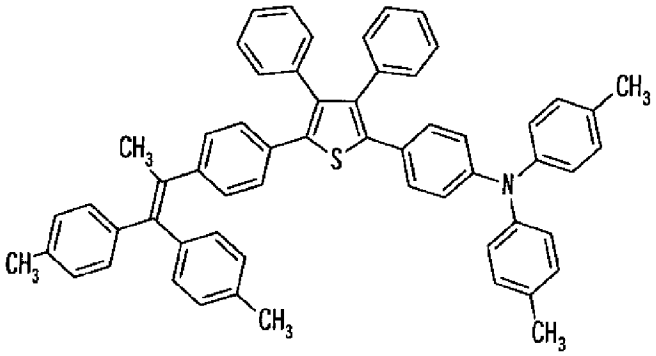
[0064]

[Chemical formula 39]

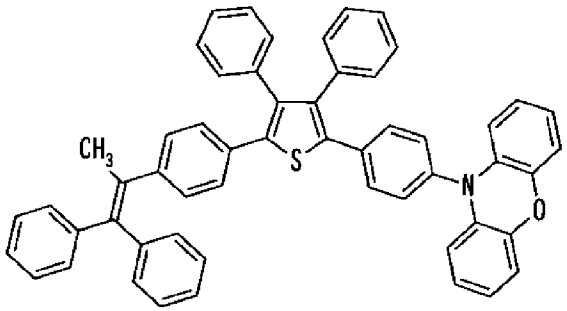
F-1



F-2



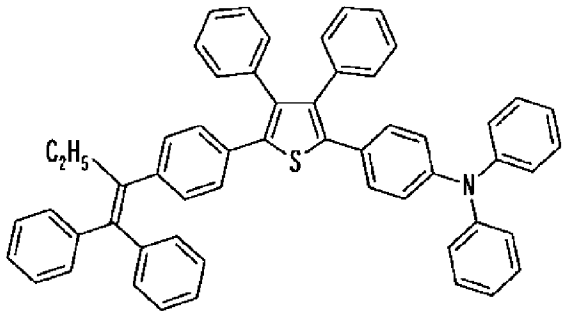
F-3



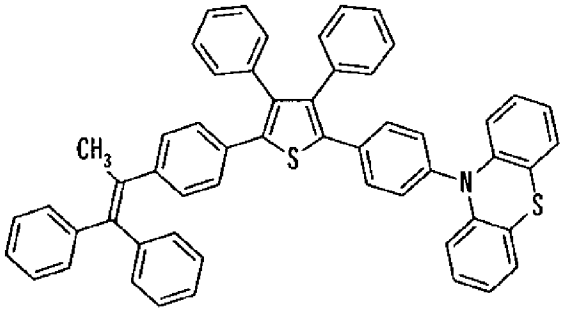
[0065]

[Chemical formula 40]

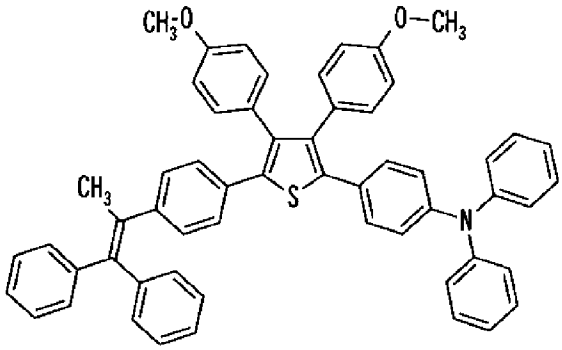
F-4



F-5



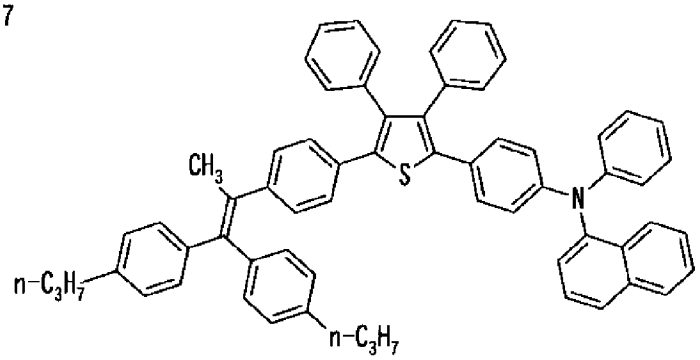
F-6



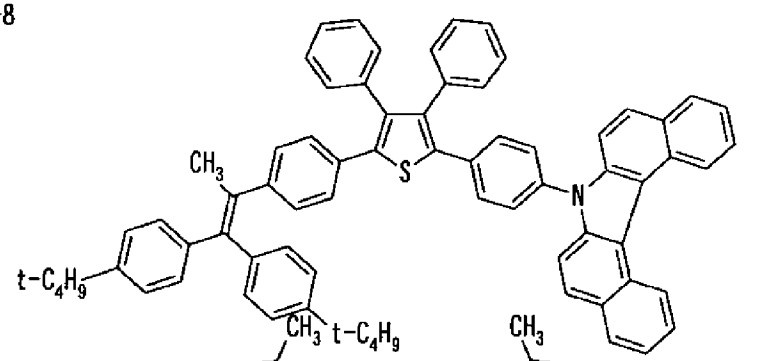
[0066]

[Chemical formula 41]

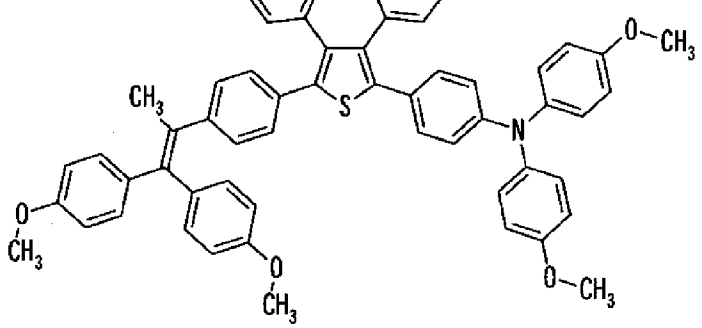
F-7



F-8



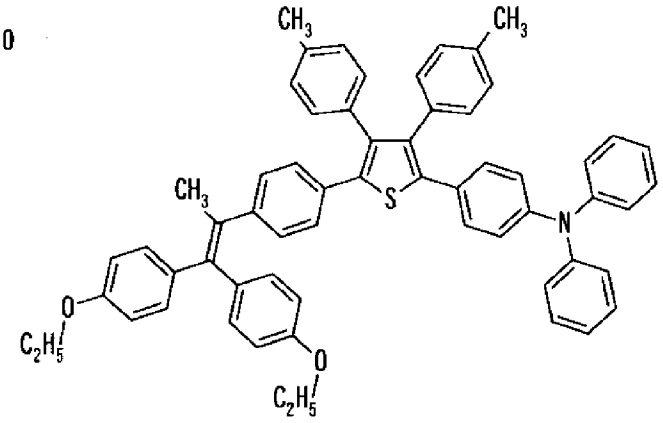
F-9



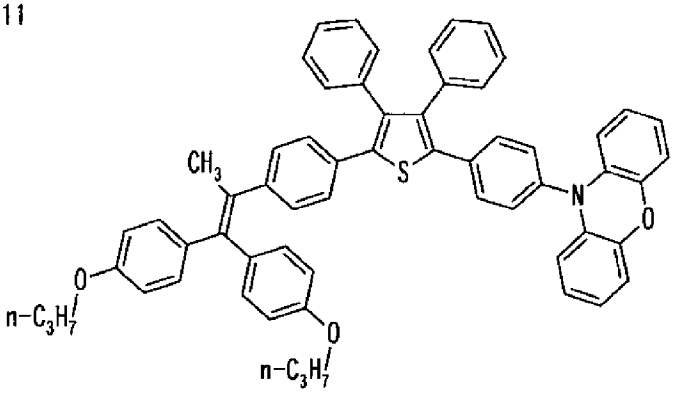
[0067]

[Chemical formula 42]

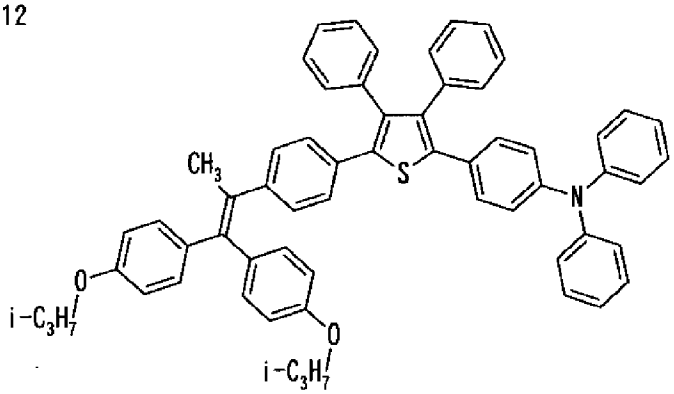
F-10



F-11



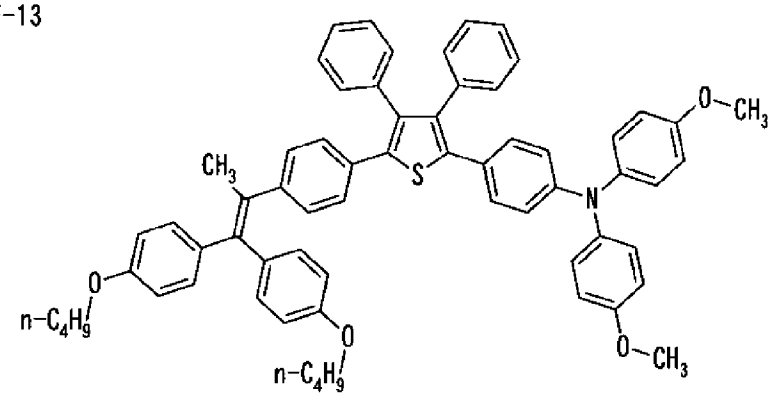
F-12



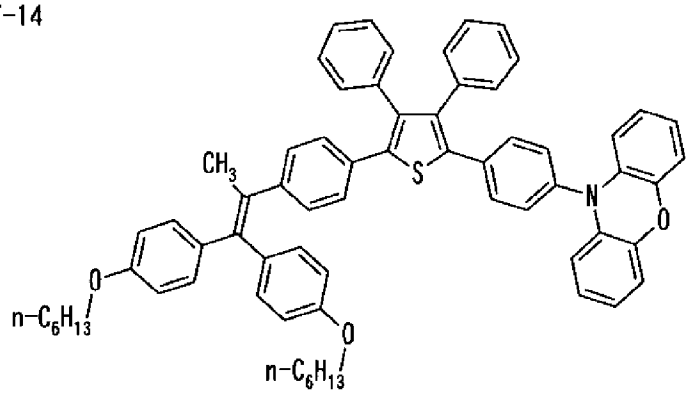
[0068]

[Chemical formula 43]

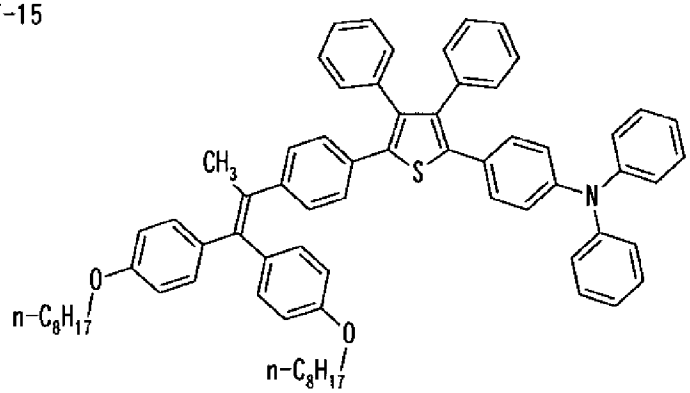
F-13



F-14



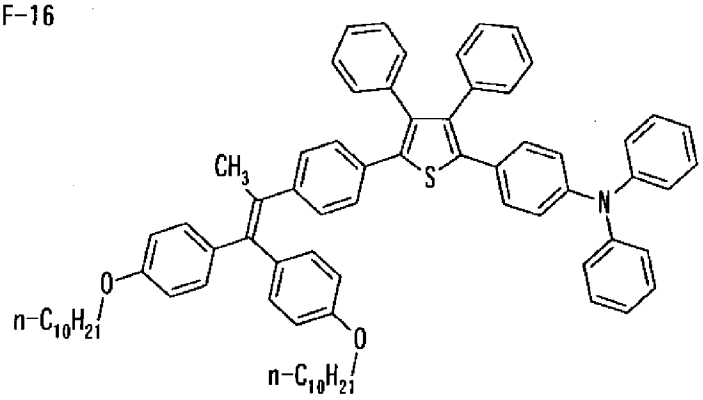
F-15



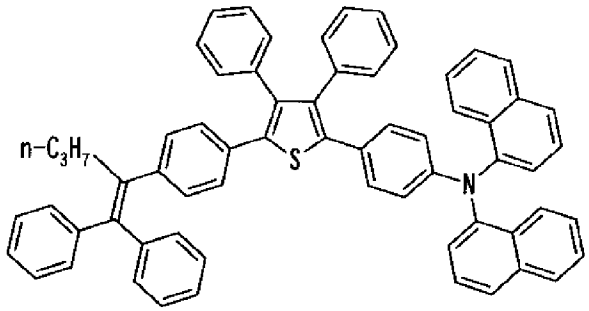
[0069]

[Chemical formula 44]

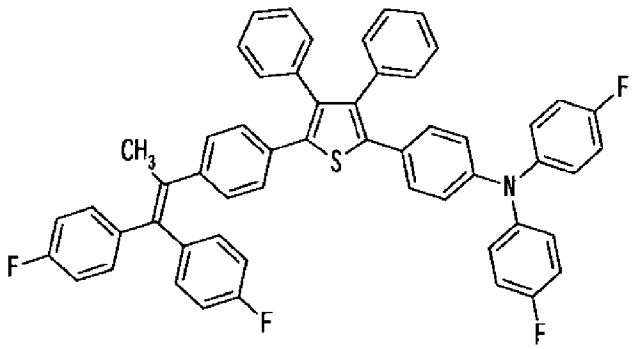
F-16



F-17



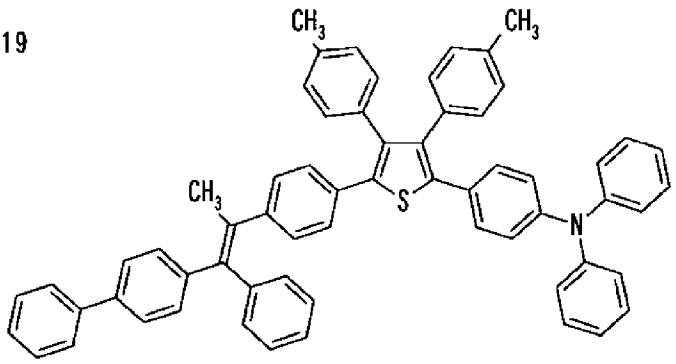
F-18



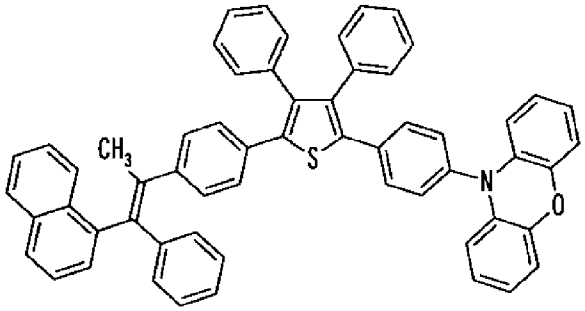
[0070]

[Chemical formula 45]

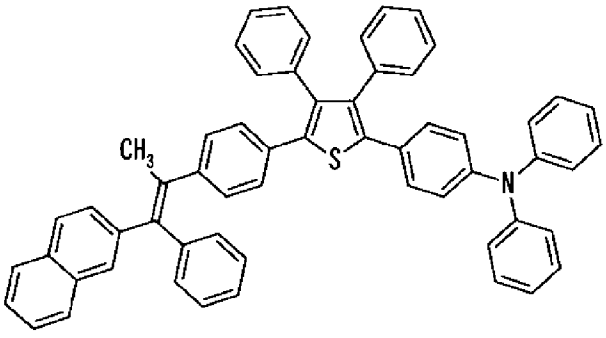
F-19



F-20



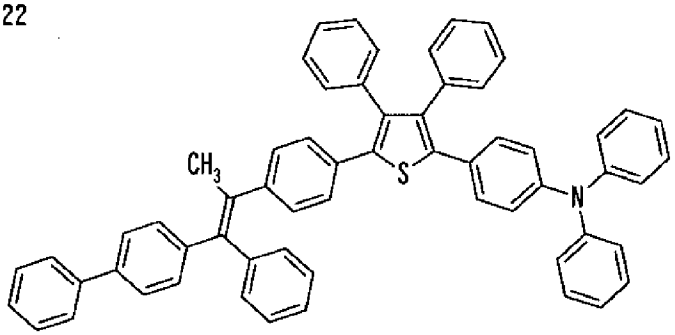
F-21



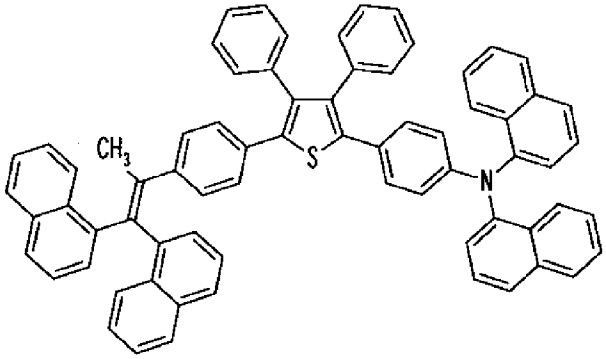
[0071]

[Chemical formula 46]

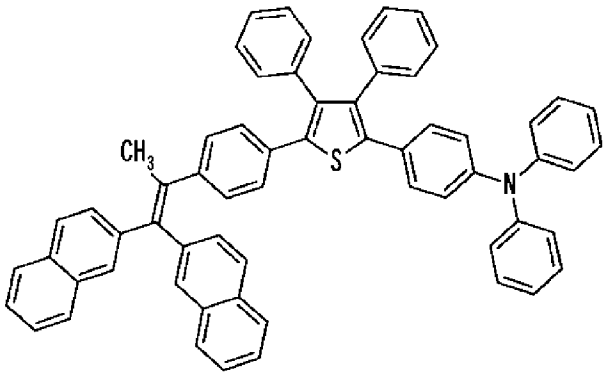
F-22



F-23



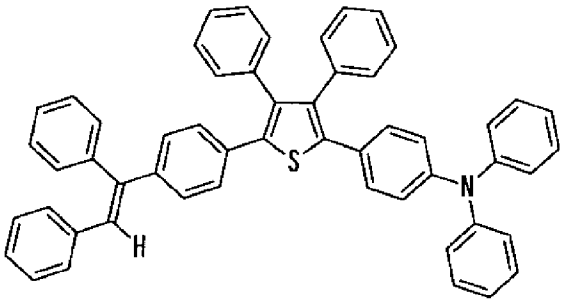
F-24



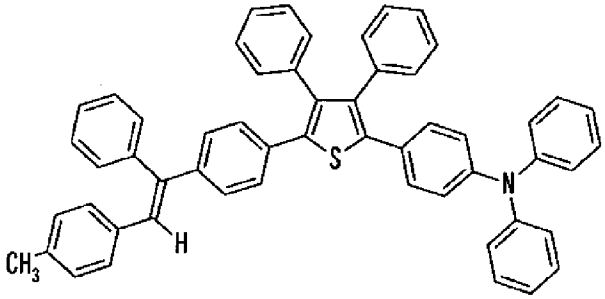
[0072]

[Chemical formula 47]

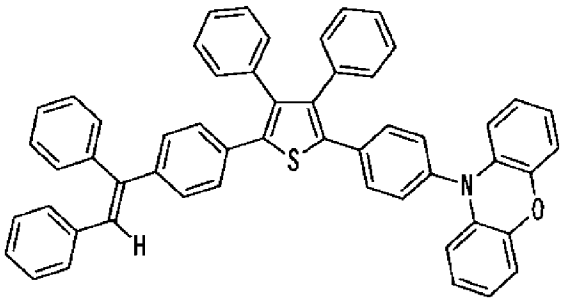
G-1



G-2



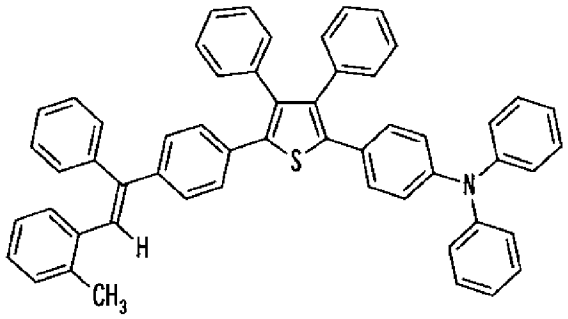
G-3



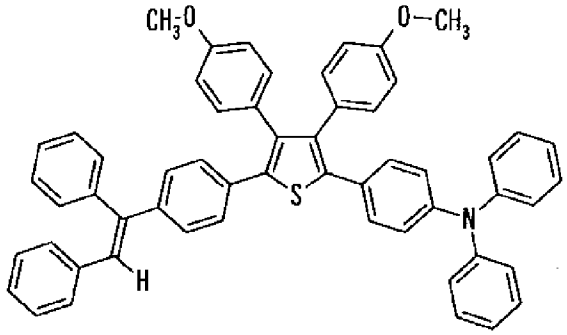
[0073]

[Chemical formula 48]

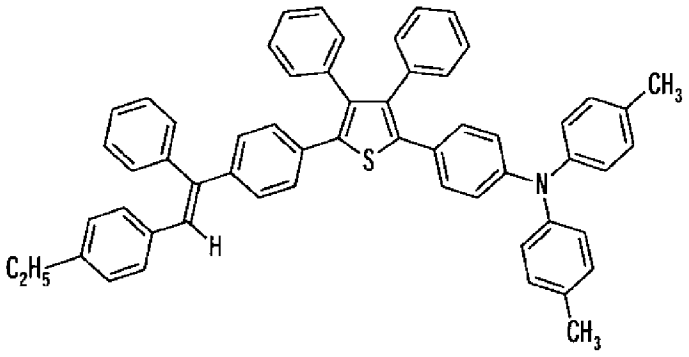
G-4



G-5



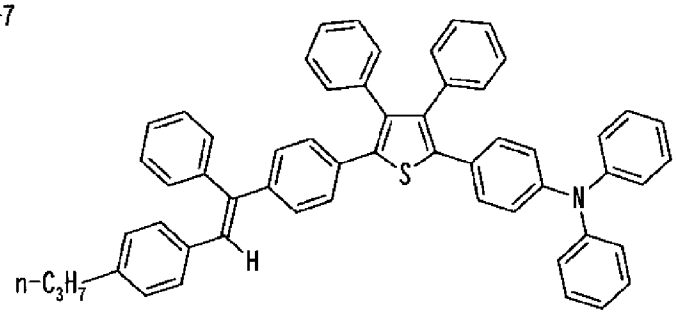
G-6



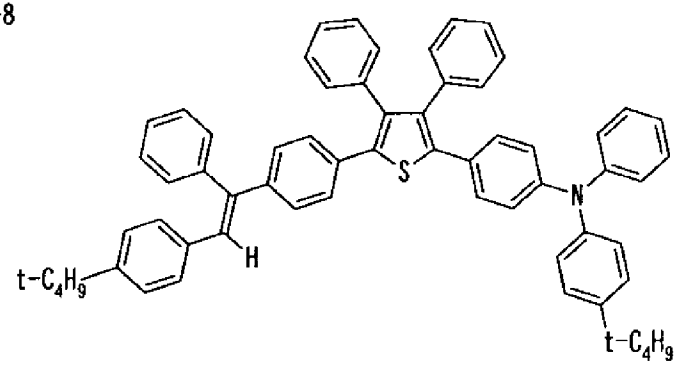
[0074]

[Chemical formula 49]

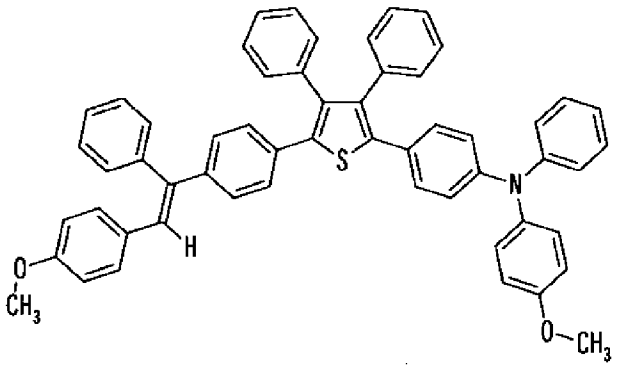
G-7



G-8



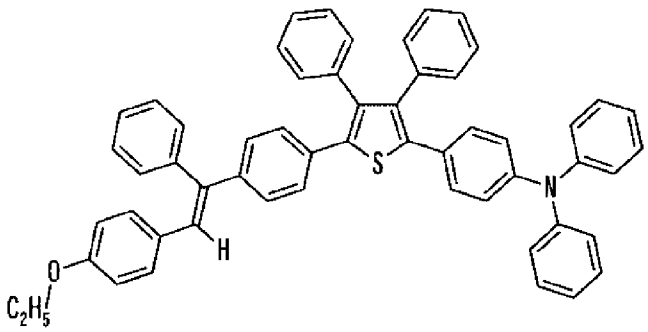
G-9



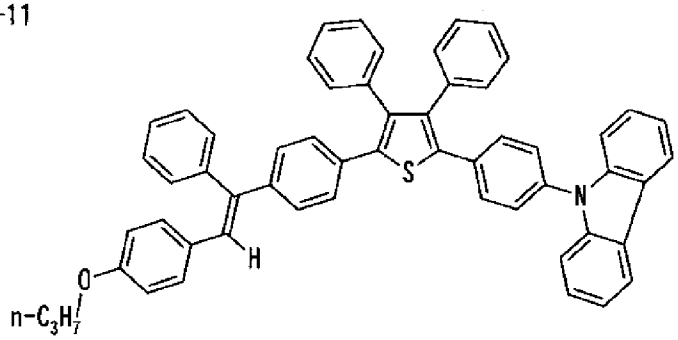
[0075]

[Chemical formula 50]

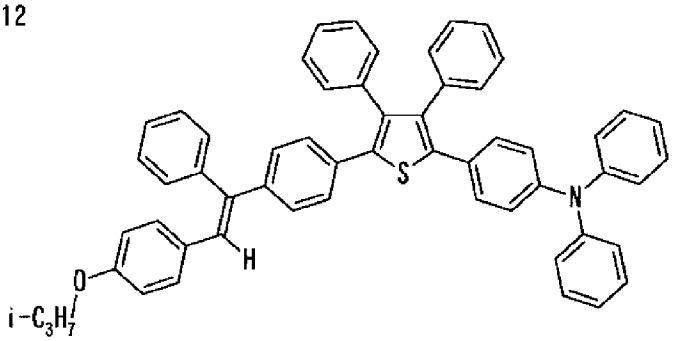
G-10



G-11



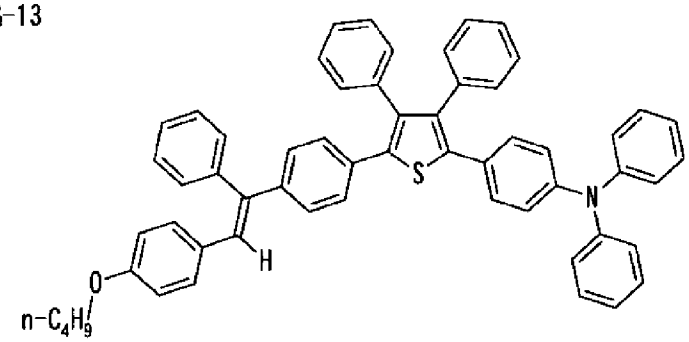
G-12



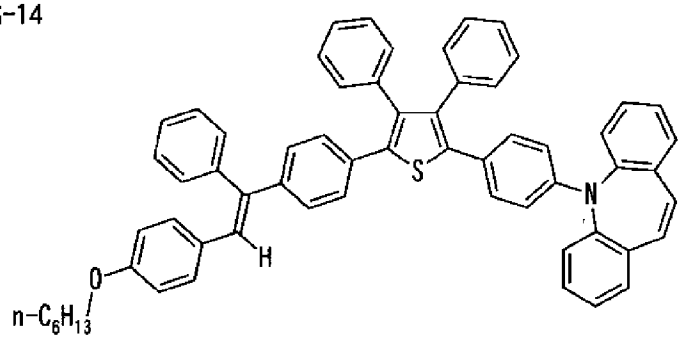
[0076]

[Chemical formula 51]

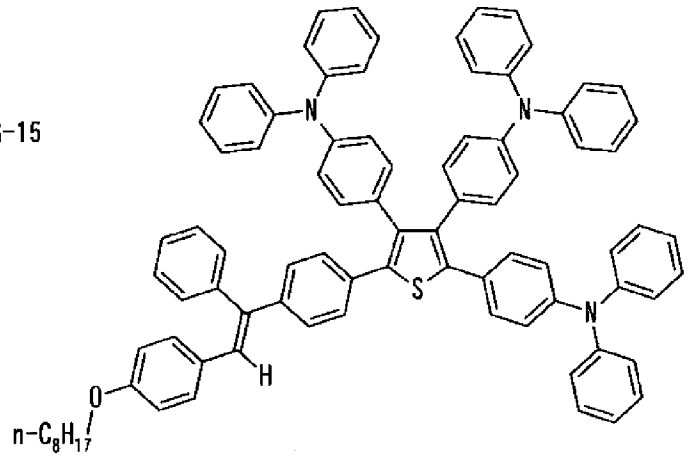
G-13



G-14



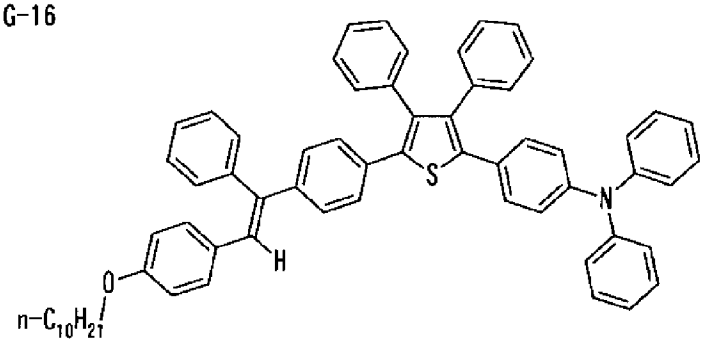
G-15



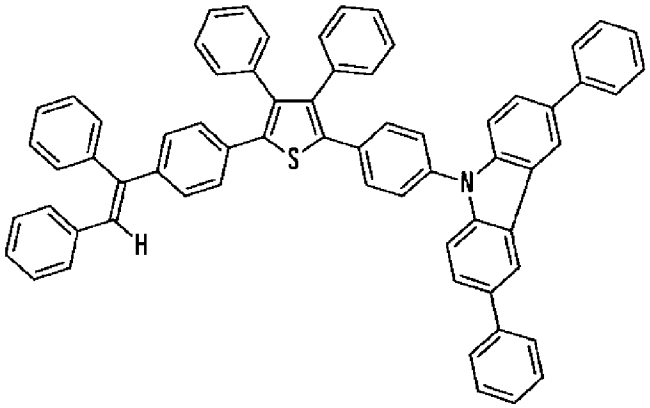
[0077]

[Chemical formula 52]

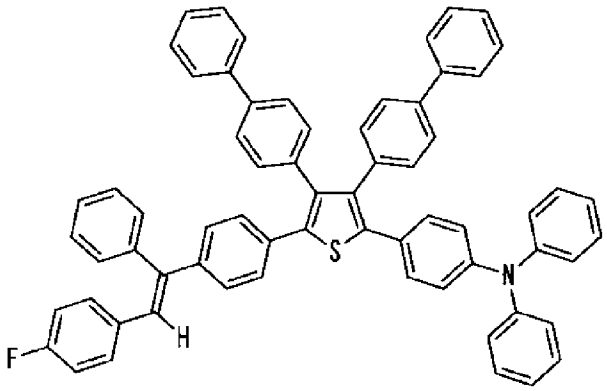
G-16



G-17



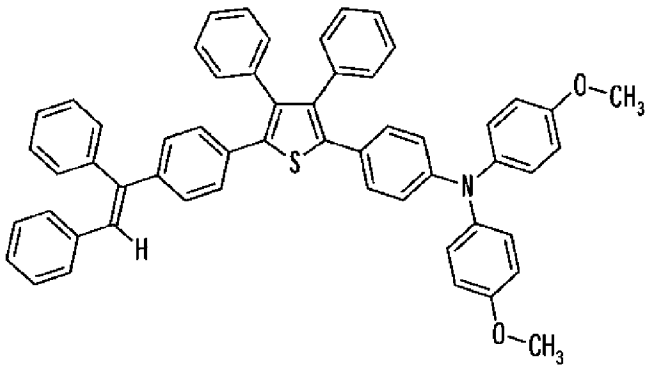
G-18



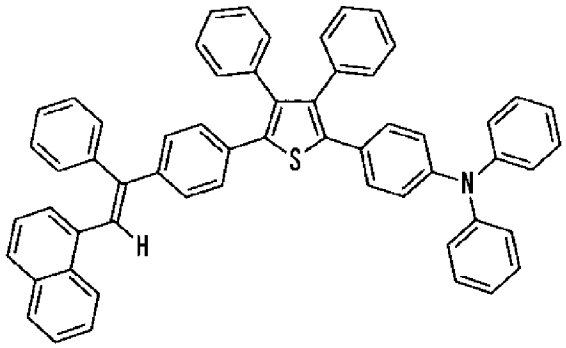
[0078]

[Chemical formula 53]

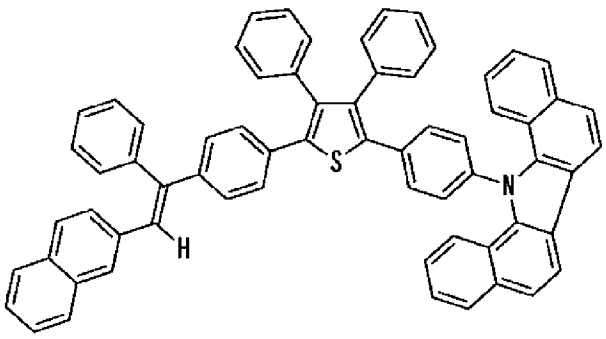
G-19



G-20



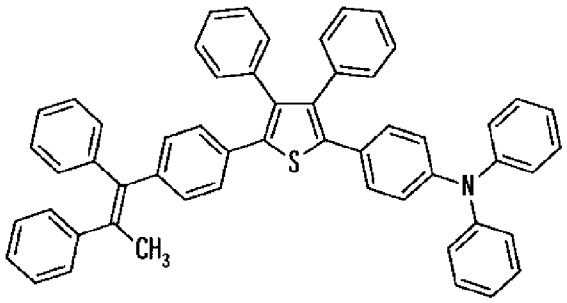
G-21



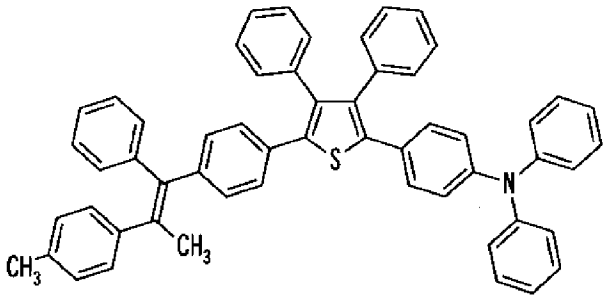
[0079]

[Chemical formula 54]

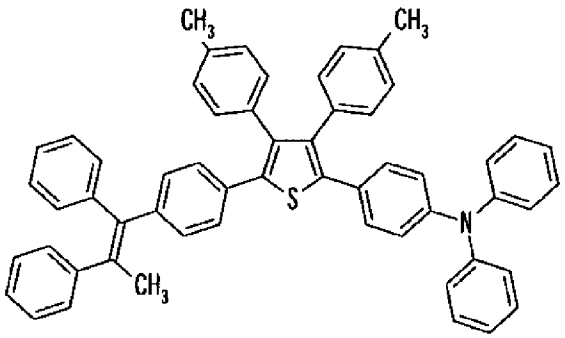
H-1



H-2



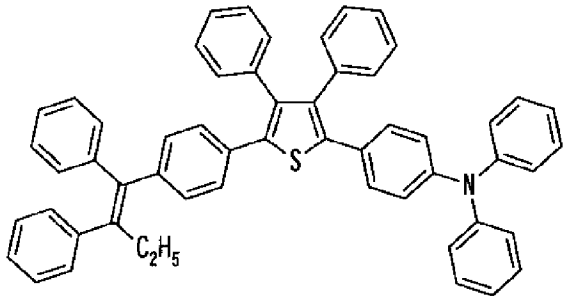
H-3



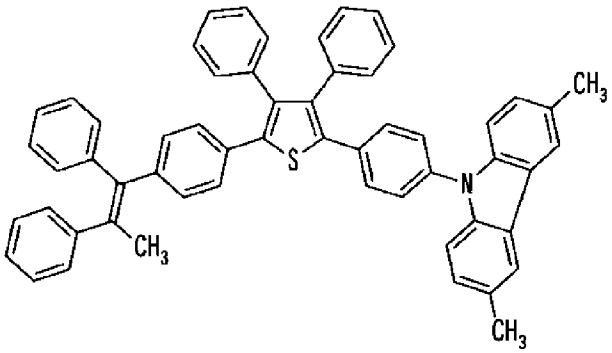
[0080]

[Chemical formula 55]

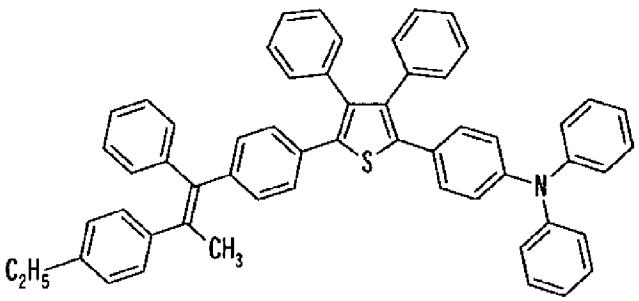
H-4



H-5



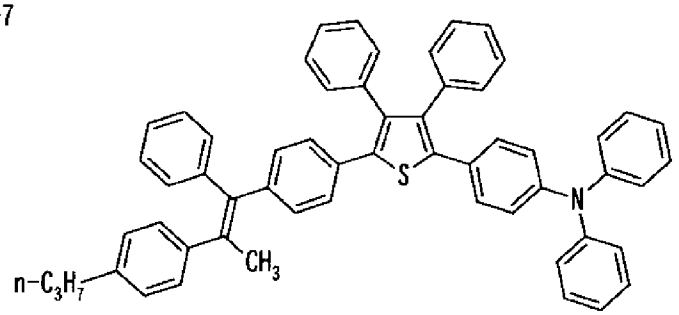
H-6



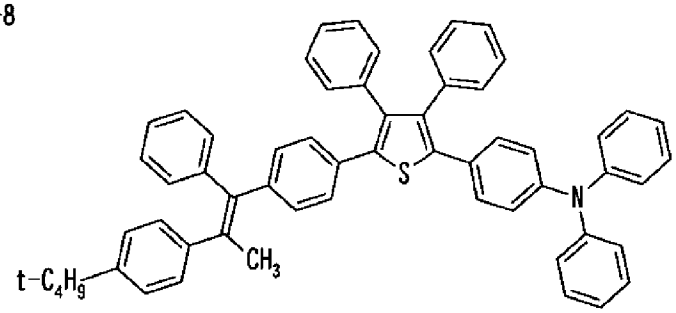
[0081]

[Chemical formula 56]

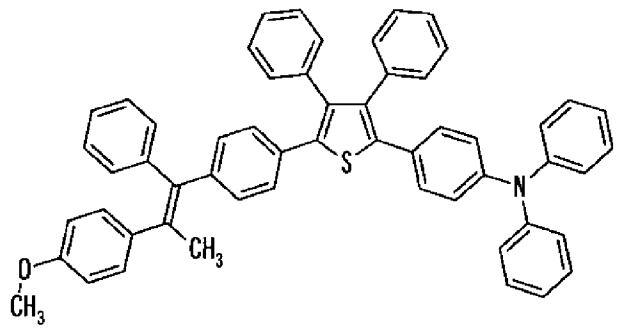
H-7



H-8



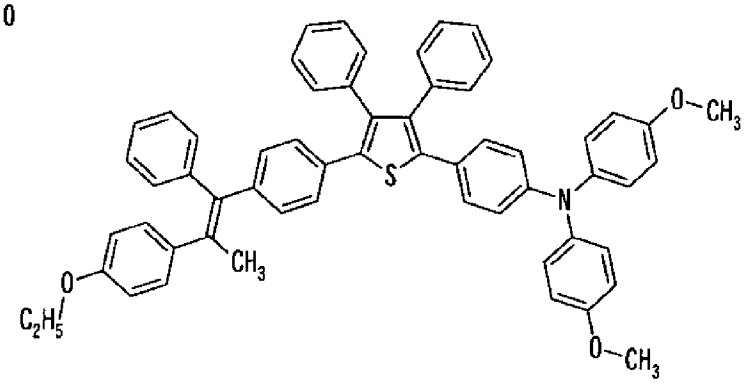
H-9



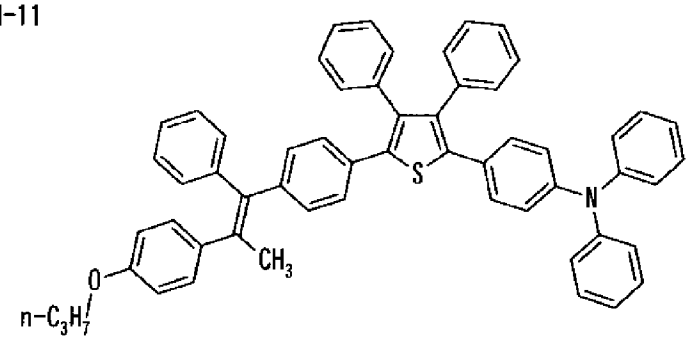
[0082]

[Chemical formula 57]

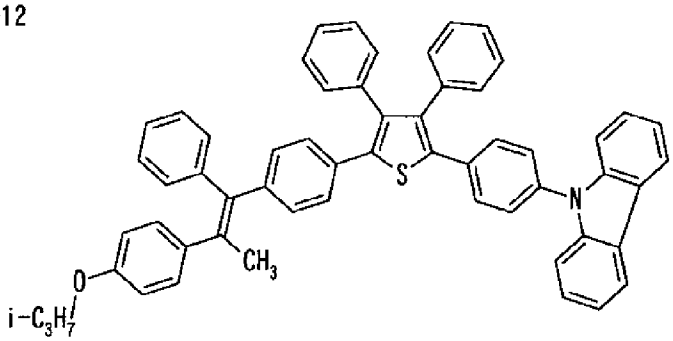
H-10



H-11



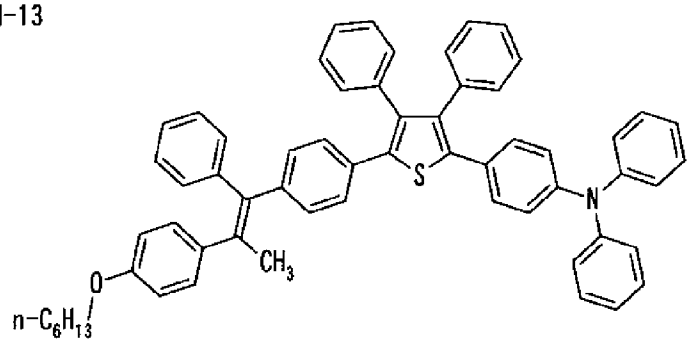
H-12



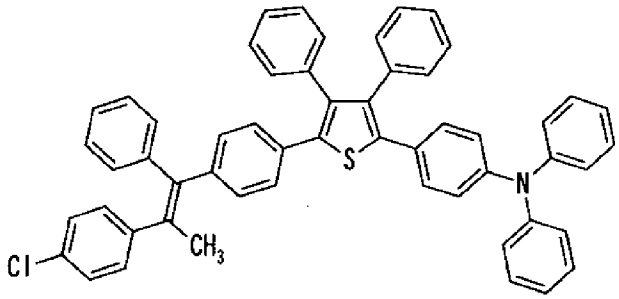
[0083]

[Chemical formula 58]

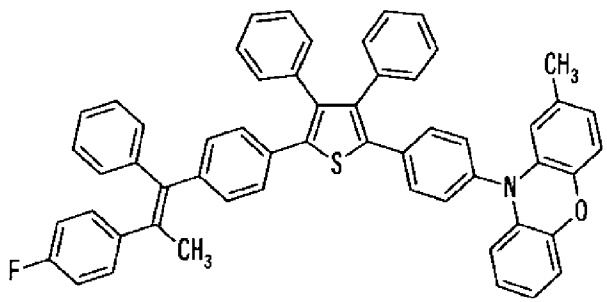
H-13



H-14



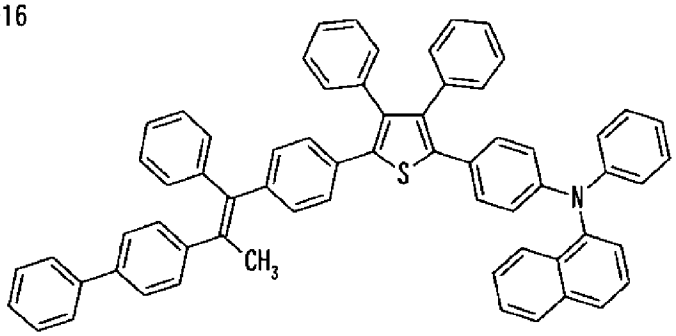
H-15



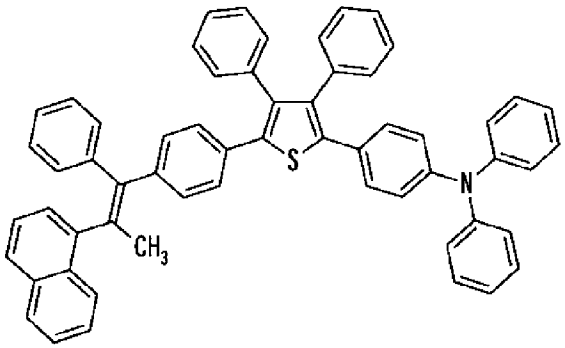
[0084]

[Chemical formula 59]

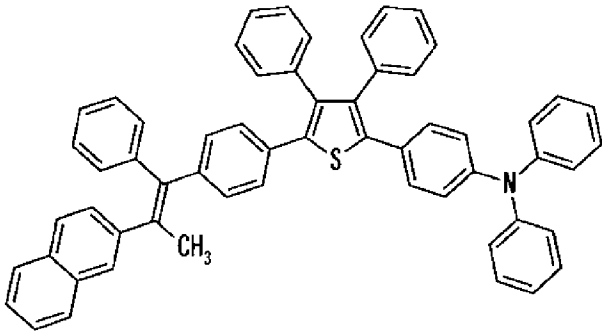
H-16



H-17



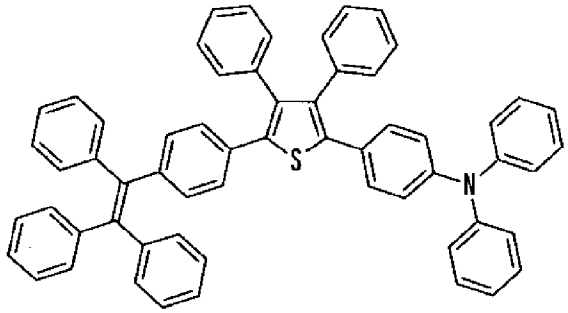
H-18



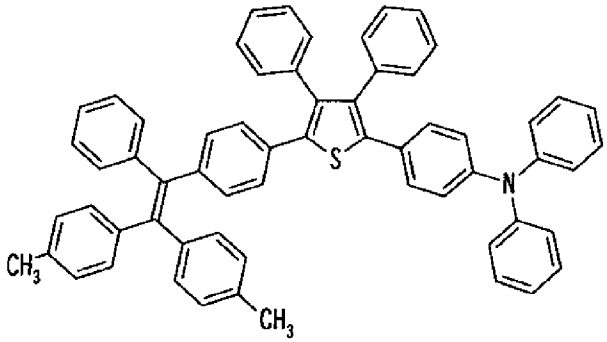
[0085]

[Chemical formula 60]

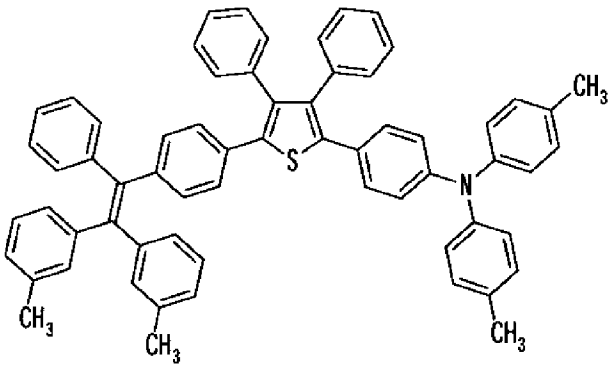
I-1



I-2



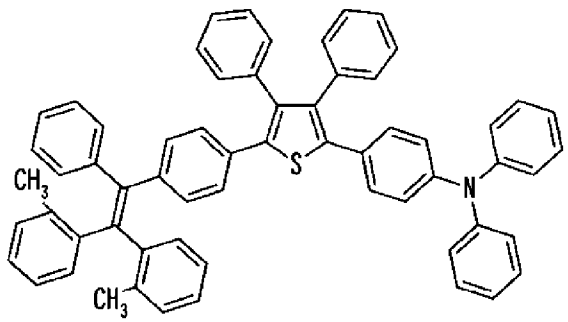
I-3



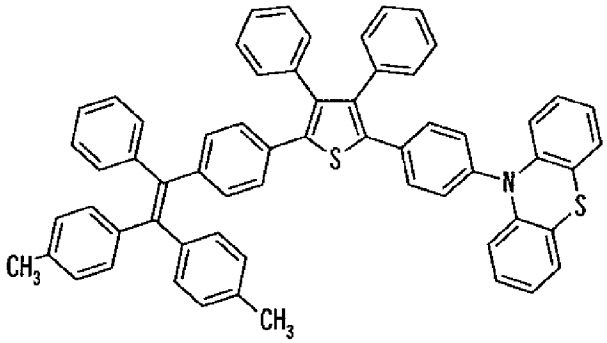
[0086]

[Chemical formula 61]

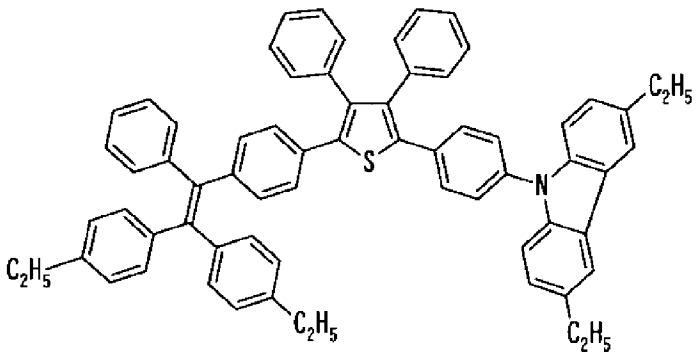
I-4



I-5



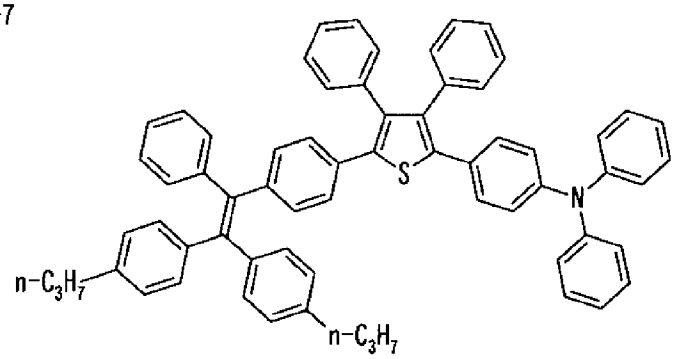
I-6



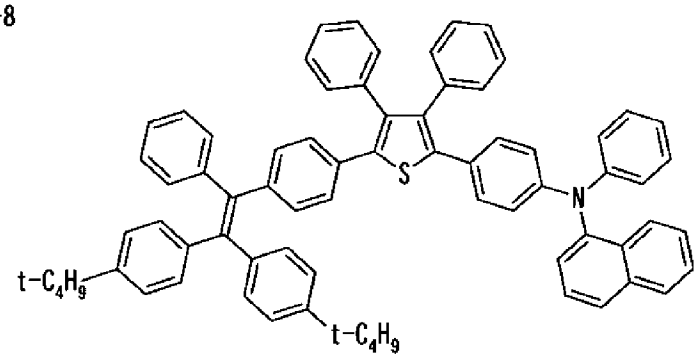
[0087]

[Chemical formula 62]

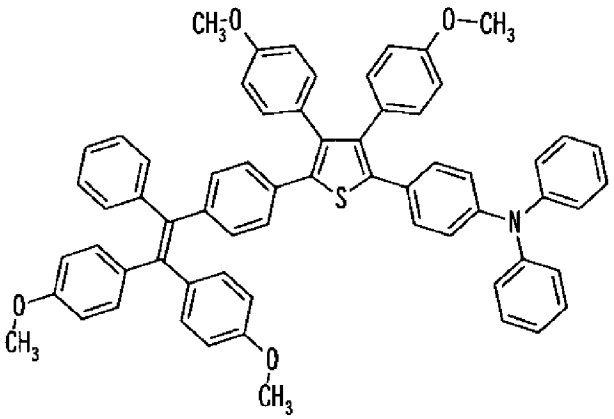
I-7



I-8



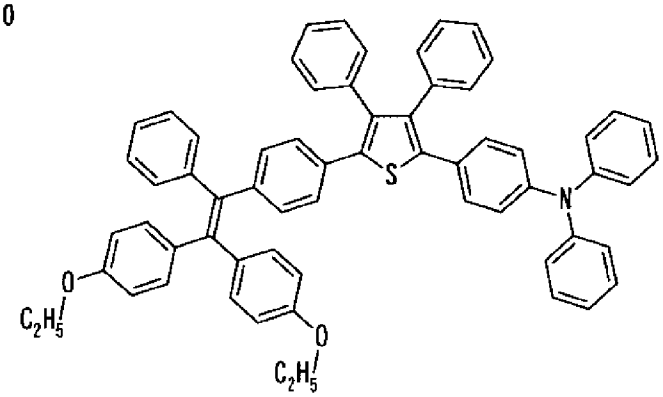
I-9



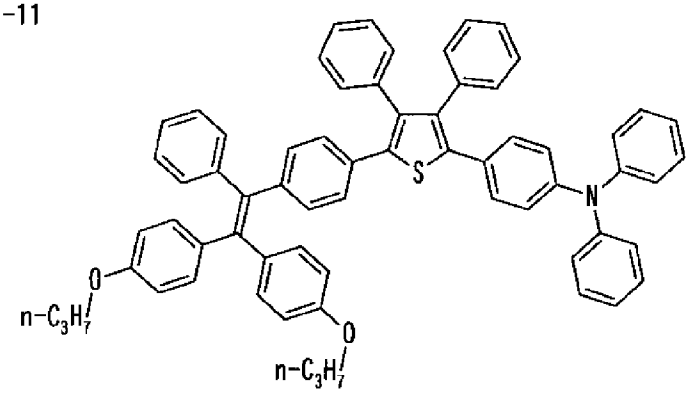
[0088]

[Chemical formula 63]

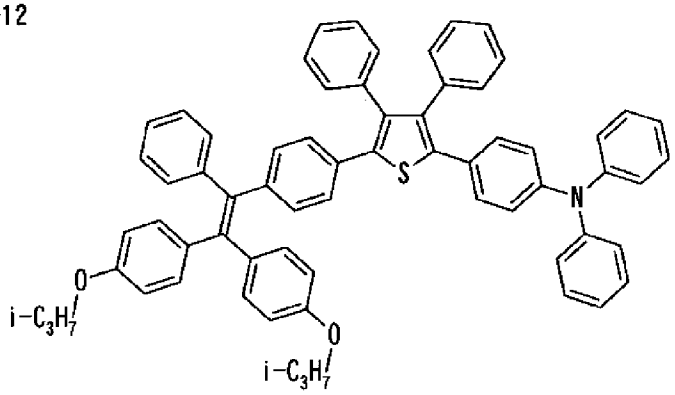
I-10



I-11



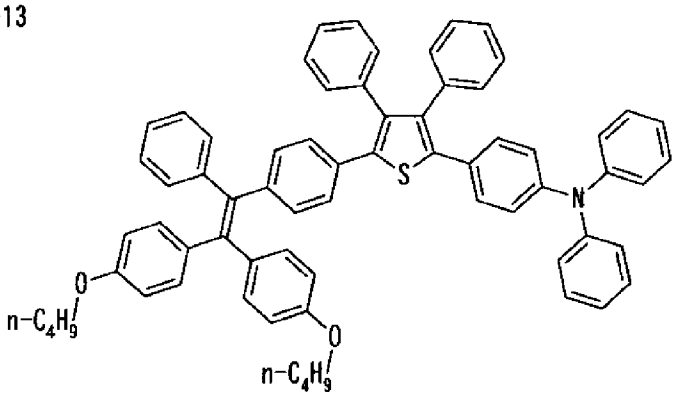
I-12



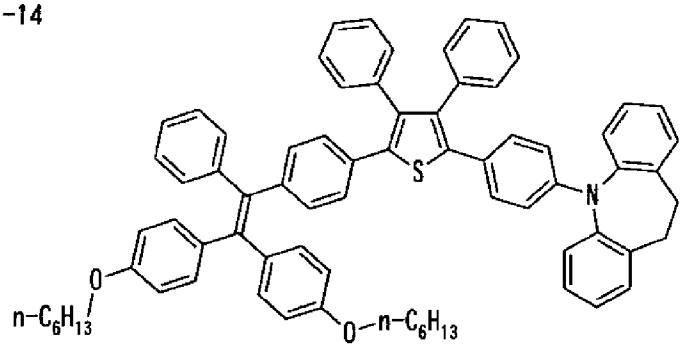
[0089]

[Chemical formula 64]

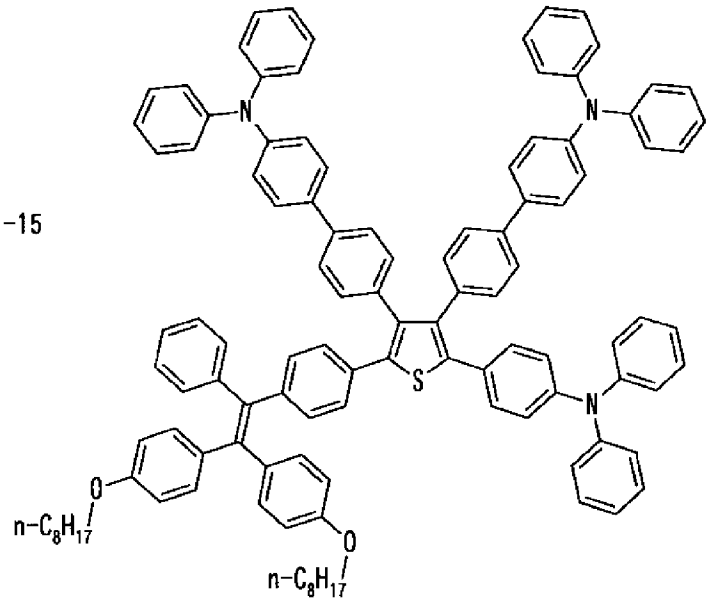
I-13



I-14



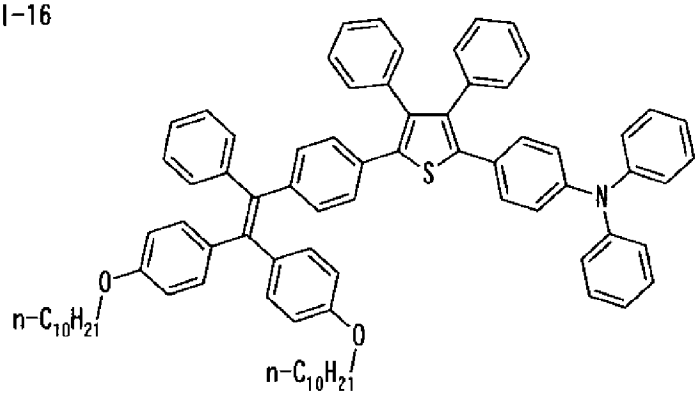
I-15



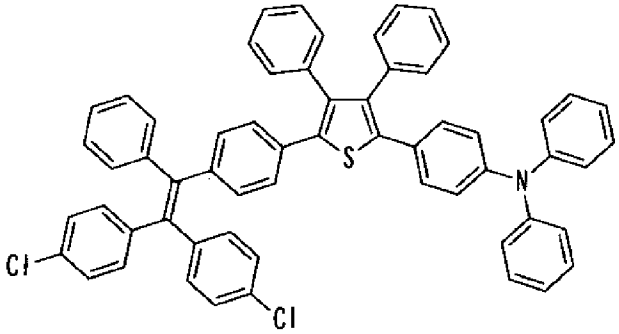
[0090]

[Chemical formula 65]

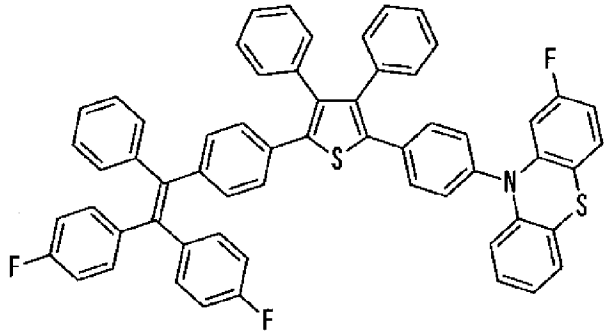
I-16



I-17



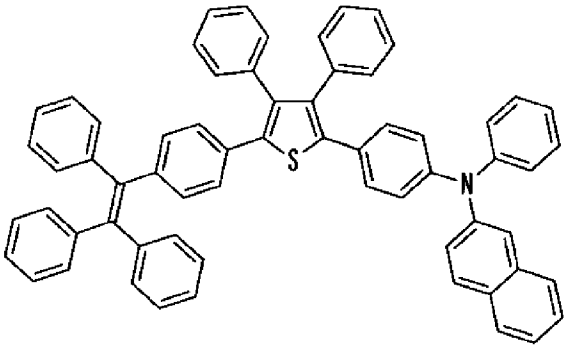
I-18



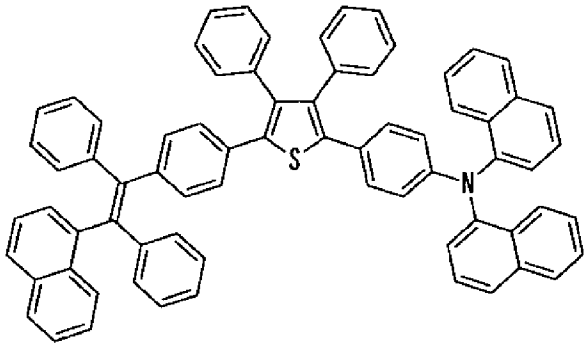
[0091]

[Chemical formula 66]

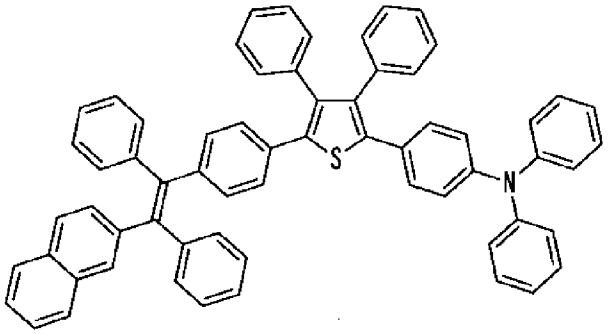
I-19



I-20



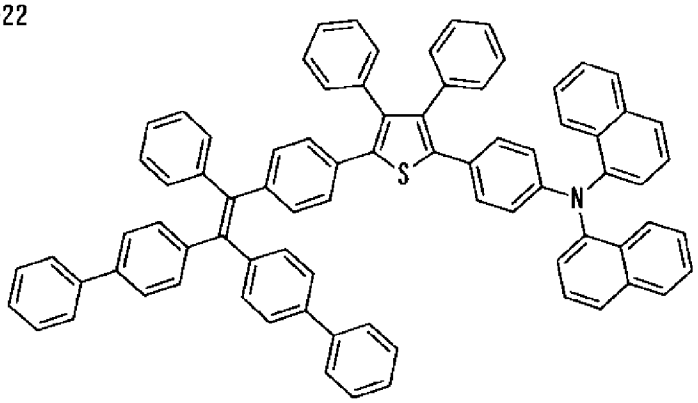
I-21



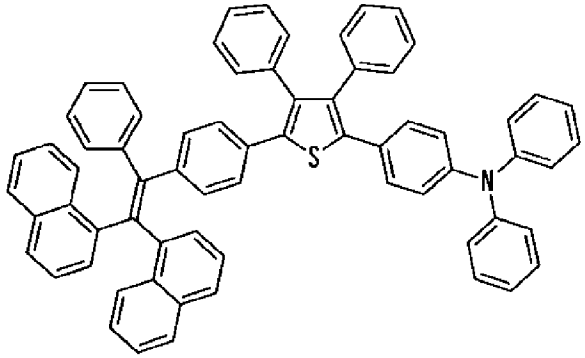
[0092]

[Chemical formula 67]

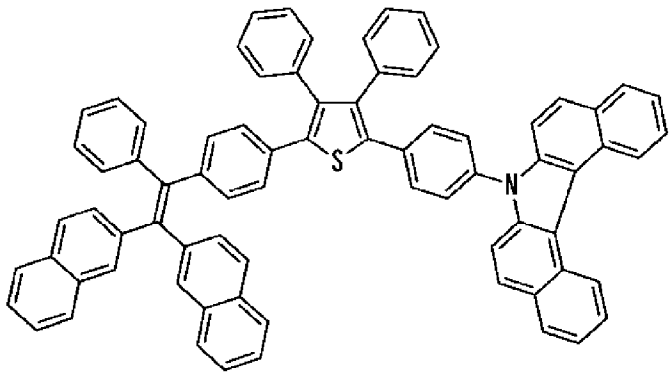
I-22



I-23



I-24

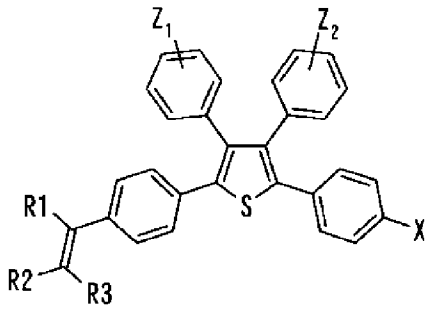


[0093]The compound denoted by the general formula (1) concerning this invention can be manufactured by the following methods, for example. That is, it can manufacture by, for

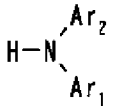
example, making the compound denoted by a general formula (2), and the compound denoted by a general formula (3) react under existence of a copper compound (for example, metal copper, a copper chloride) (Ullman reaction).

[0094]

[Chemical formula 68]



(2)



(3)

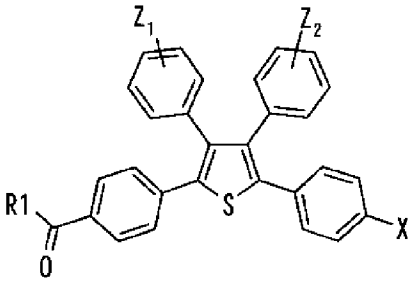
(R1-R3, Ar_1, Ar_2, Z_1, and Z_2 express the above-mentioned meaning among a formula, and X expresses a halogen atom)

[0095]In a general formula (2), X expresses a halogen atom, expresses a chlorine atom, a bromine atom, or iodine Harako, and expresses a bromine atom or iodine Harako more preferably.

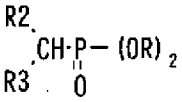
[0096]The compound denoted by a general formula (2) can be manufactured by making the phosphonic acid derivative denoted by the carbonyl compound denoted by the following general formula (4), and the following general formula (5), for example react under existence of a base.

[0097]

[Chemical formula 69]



(4)



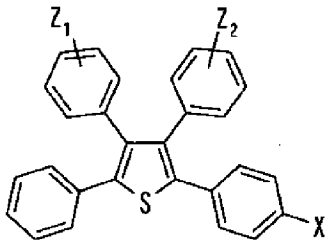
(5)

(R1-R3, Z_1, Z_2, and X express the above-mentioned meaning among a formula, and R expresses the alkyl group or phenyl group of the carbon numbers 1-4.)

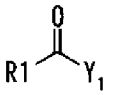
[0098][the compound denoted by a general formula (4)] [the carboxylic acid halide denoted by the compound denoted by the following general formula (6), and the following general formula (7), for example] For example, it can manufacture by making it react under existence of an aluminium chloride (see the method of a description to J.Polym.Sci.Polym.Chem.Ed., and 23 and 1787 (1985)).

[0099]

[Chemical formula 70]



(6)



(7)

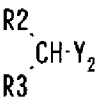
(R1, Z_1, Z_2, and X express the above-mentioned meaning among a formula, and Y_1 expresses a halogen atom.)

[0100]In a general formula (7), Y_1 expresses a halogen atom and expresses a chlorine atom and a bromine atom preferably.

[0101]The phosphonic acid derivative denoted by a general formula (5) can be manufactured by, for example, making the compound denoted by the following general formula (8) react to the bird alkoxy phosphine denoted by the following general formula (9).

[0102]

[Chemical formula 71]



(8)

(9)

(R2, R3, and R express the above-mentioned meaning among a formula, and Y_2 expresses a halogen atom.)

[0103]In a general formula (8), Y_2 expresses a halogen atom and expresses a chlorine atom, a bromine atom, and iodine Harako preferably.

[0104]Although the compound denoted by the general formula (1) concerning this invention may be manufactured in the form in which the solvent sum with the solvent (for example, aromatic hydrocarbon system solvents, such as toluene) used by the case was formed, [a compound] In this invention, the compound denoted by the general formula (1) concerning this invention includes such solvent ****. Of course, non-solvent **** which does not contain a solvent is also included.

[0105]Such solvent **** can also be used for the organic electroluminescence element of this invention as well as non-solvent **** of a compound denoted by the general formula (1) concerning this invention.

[0106]When using the compound denoted by the general formula (1) concerning this invention for an organic electroluminescence element, it is desirable to use together refining methods, such as the re-crystallizing method, the column chromatography method, and a sublimation refining process, or these methods, and to use the compound which raised purity. An organic electroluminescence element usually pinches further at least the luminous layer which contains a kind of luminescence ingredient at least in inter-electrode [a pair of]. In consideration of each functional level of electron hole pouring of a compound and electron hole transportation, electronic pouring, and electronic transportation used for a luminous layer, the electronic pouring transportation layer containing the electron hole pouring transportation layer and/or electronic pouring transportation ingredient containing an electron hole pouring transportation ingredient can also be provided according to a request.

[0107]For example, when the electron hole pouring function of the compound used for a luminous layer, an electron hole transportation function and/or an electronic pouring function, and an electronic transportation function are good, a luminous layer can have composition of the element of a model which served both as the electron hole pouring transportation layer and/or the electronic pouring transportation layer. Of course, it can also have composition of the element (much more model element) of the model which does not provide the layer of both an electron hole pouring transportation layer and an electronic pouring transportation layer

depending on the case.

[0108][each layer of an electron hole pouring transportation layer, an electronic pouring transportation layer, and a luminous layer] It may be structure much more or may be multilayer structure, and in each layer, an electron hole pouring transportation layer and the electronic pouring transportation layer can provide separately the layer which has a pouring function, and the layer which has a transportation function, and can also constitute it.

[0109]In the organic electroluminescence element of this invention, as for the compound denoted by the general formula (1) concerning this invention, it is preferred to use for an electron hole pouring transportation ingredient, a luminescence ingredient, or an electronic pouring transportation ingredient, it is more preferred to use for an electron hole pouring transportation ingredient or a luminescence ingredient, and especially its thing used for a luminescence ingredient is preferred. In the organic electroluminescence element of this invention, the compound denoted by the general formula (1) concerning this invention may be used alone, or may be used together. [two or more]

[0110]Especially as composition of the organic electroluminescence element of this invention, it is not what is limited, For example, an electron hole pouring transportation layer / luminous layer / electronic pouring transportation layer / (A) anode / negative pole type element (drawing 1), (B) An anode / electron hole pouring transportation layer / luminous layer / negative pole type element (drawing 2), (C) anode / luminous layer / electronic pouring transportation layer / negative pole type element (drawing 3), (D) anode / luminous layer / negative pole type element (drawing 4), etc. can be mentioned. A luminous layer can also be used as (E) anode / electron hole pouring transportation layer / electronic pouring transportation layer / luminous layer / electronic pouring transportation layer / negative pole type element (drawing 5) which was put in the electronic pouring transportation layer and which is an element of a model. (D) Although the element of the model which made inter-electrode [a pair of] pinch a luminescence ingredient with a form further is included as element composition of a model, The element of the model which it, for example, made inter-electrode [a pair of] pinch with the one-layer form which mixed (F) electron hole pouring transportation ingredient, the luminescence ingredient, and the electronic pouring transportation ingredient (drawing 6), (G) There is an element (drawing 8) of the model which it made inter-electrode [a pair of] pinch with the one-layer form which mixed the element (drawing 7) of the model which it made inter-

electrode [a pair of] pinch with the one-layer form which mixed the electron hole pouring transportation ingredient and the luminescence ingredient, (H) luminescence ingredient, and the electronic pouring transportation ingredient.

[0111]In the organic electroluminescence element of this invention, it cannot restrict to these element composition and an electron hole pouring transportation layer, a luminous layer, and a two or more layers electronic pouring transportation layer can be provided in each type of element. In each type of element, the mixed layer of a luminescence ingredient and an electronic pouring transportation ingredient can also be provided between an electron hole pouring transportation layer and a luminous layer between the mixed layer of an electron hole pouring transportation ingredient and a luminescence ingredient and/or a luminous layer, and an electronic pouring transportation layer.

[0112]The composition of a more desirable organic electroluminescence element is (A) model element, (B) model element, (C) model element, (E) model element, (F) model element, (G) model element, or (H) model element, and is (A) model element, (B) model element, (C) model element, (F) model element, or (H) model element still more preferably.

[0113]About the organic electroluminescence element of this invention, the electron hole pouring transportation layer / luminous layer / electronic pouring transportation layer / (A) anode / negative pole type element shown in drawing 1 are explained as an example of representation.

[0114]in drawing 1 -- 1 -- a substrate and 2 -- a luminous layer and 5 show an electronic pouring transportation layer, 6 shows the negative pole, and, as for an electron hole pouring transportation layer and 4, an anode and 3 show a power supply 7.

[0115]As for the electroluminescence element of this invention, being supported by the substrate 1 is preferred, and, [as a substrate] Although it does not limit in particular, the transparent translucent thing which is and carries out is preferred, for example, a glass board and a transparent plastic sheet (for example, polyester.) What consists of a composite sheet which combined sheets, such as polycarbonate, polysulfone, poly methyl methacrylate,

polypropylene, and polyethylene, a translucent plastic sheet, quartz, transparent Ceramics Sub-Division, or these can be mentioned. A luminescence color is also controllable to a substrate combining a color filter film, a color conversion film, and a dielectric reflection film, for example.

[0116]It is preferred to use metal with a comparatively large work function, an alloy, or an electrical conductivity compound as an electrode substance as the anode 2.

[0117]As an electrode substance used for an anode, gold, platinum, silver, copper, cobalt, nickel, palladium, vanadium, tungsten, tin oxide, a zinc oxide, ITO (indium Tin oxide), poly CHIOFEN, polypyrrole, etc. can be mentioned, for example. These electrode substances may be used alone or may be used together. [two or more]

[0118]An anode can be formed on a substrate by methods, such as the vapor-depositing method and the sputtering method, using these electrode substances. An anode may be structure much more or may be multilayer structure. Below hundreds of ohms / ** set the sheet electrical resistance of an anode as 5-50ohms / ** grade more preferably. Although the thickness of an anode is based also on the material of the electrode substance to be used, generally it is more preferably set as about 10-500 nm about 5-1000 nm.

[0119]The electron hole pouring transportation layer 3 is a layer containing the compound which has the function to convey the electron hole which makes easy pouring of the electron hole (hole) from an anode, and which was functioned and poured in. The compound which has the compound and/or other electron hole pouring transportation functions in which it is expressed with the general formula (1) which requires an electron hole pouring transportation layer for this invention. for example, a phthalocyanine derivative and doria -- a reel methane derivative and doria -- a reel amine derivative. It can form using an OKISAZORU derivative, a hydrazone derivative, a SUCHIRUBEN derivative, a pyrazoline derivative, a polysilane derivative, poly phenylenevinylene and its derivative, poly CHIOFEN and its derivative, a poly-N-vinylcarbazole derivative, etc. at least one sort. The compound which has an electron hole pouring transportation function may be used alone, or may be used together. [two or more]

[0120]as the compound which has other electron hole pouring transportation functions to use in this invention -- doria -- a reel amine derivative, poly CHIOFEN and its derivative, and a poly-N-vinylcarbazole derivative are preferred.

[0121]doria -- as the example of a reel amine derivative -- a 4 and 4'-screw [N-phenyl N-(4"-methylphenyl) amino] Biphenyl, 4, and 4'-screw [N-phenyl N-(3"-methylphenyl) amino] Biphenyl, 4, and 4'-screw [N-phenyl N-(3"-methoxypheny) amino] Biphenyl, 4, and 4'-screw [N-phenyl N-(1"-Naff Chill) amino] Biphenyl, 3, a 3 '- ********- 4 and 4'-screw [N-phenyl N-(3"-methylphenyl) amino] Biphenyl, 1, and 1-screw [4'-[N and N-JI (4"-methylphenyl) amino] phenyl] Cyclohexane, 9, 10-screw [N-(4'-methylphenyl)-N-(4"-n-buthylphenyl) amino] Phenanthrene, 3, 8-bis(N and N-diphenylamino)-6-phenyl phenanthridine, the 4-methyl N, N-screw [-- four -- " -- four -- ' -- ' -- ' - a screw -- [-- N -- ' -- N -- ' -- ' - JI (4-methylphenyl) -- amino --] -- biphenyl -- four - IRU --] Aniline, N, an N"-screw [4-(diphenylamino) phenyl] -N and N'-diphenyl 1, 3-Gia Minot Ben Senn, N, N'-screw [4-(diphenylamino) phenyl] -The N and N'-diphenyl 1, 4-Gia Minot Ben Senn, 5, a 5"-screw [4-(bis[4-methylphenyl] amino) phenyl] -two -- two -- ' -- : -- five -- ' -- two -- " - TACHIOFEN -- one -- three -- five - tris (diphenylamino) -- benzene -- four -- four -- ' -- four -- " - tris (N-KARUBAZORIIRU) -- a bird -- phenylamine -- four -- four -- ' -- four -- " - tris [N-(3"'-methylphenyl)-N-phenylamino] Bird phenylamine, 4, 4', 4"-tris [N and N-bis(4"'-tert-butyl biphenyl 4""-IRU)amino] Bird phenylamine, 1 and 3, 5-tris [N-(4'-diphenyl aminophenyl)-N-phenylamino] Benzene etc. can be mentioned.

[0122]When using together the compound denoted by the general formula (1) concerning this invention, and the compound which has other electron hole pouring transportation functions, the rate of a compound denoted by the general formula (1) concerning this invention occupied in an electron hole pouring transportation layer is preferably prepared to about 0.1 to 40weight %.

[0123]The luminous layer 4 is a layer containing the compound which has an electron hole and electronic pouring functions, those transportation functions, and the function to make re-combination of an electron hole and an electron generate an exciton.

[0124]The compound which has the compound and/or other luminescence functions in which it is expressed with the general formula (1) which requires a luminous layer for this invention, For

example, an AKURIDON derivative, a cinchona bark KURIDON derivative, a diketo pyrrolo pyrrole derivative, a polyaromatic compound and doria -- a reel amine derivative, an organic metal complex, and a SUCHIRUBEN derivative. A coumarin derivative, a pyran derivative, oxazone derivative, a benzothia ZORU derivative, A BENZOOKI Southall derivative, a benzimidazole derivative, a pyrazine derivative, A cinnamic acid ester derivative, poly-N-vinylcarbazole, and its derivative, Poly CHIOFEN and its derivative, poly phenylene, and its derivative, Poly full OREN and its derivative, poly phenylenevinylene, and its derivative, It can form using PORIBI phenylenevinylene and its derivative, PORITA phenylenevinylene and its derivative, poly naphthylene BINIREN and its derivative, poly thienylene BINIREN, its derivative, etc. at least one sort.

[0125]As an example of a polyaromatic compound, rubrene, anthracene, TETORASEN, Pyrene, PERIREN, KURISEN, a DEKASHI crane, KORONEN, tetra-phenyl cyclo PENTAJIEN, PENTA phenyl cyclohexa JIEN, 9, 10-diphenyl anthracene, 9, 10-bis(phenyl ECHINIRU) anthracene, 1, 4-bis(9'-ECHINIRU anthracenyl)benzene, 4, and 4'-bis(9"-ECHINIRU anthracenyl)biphenyl etc. can be mentioned. doria -- the compound mentioned above as an example of a reel amine derivative as a compound which has an electron hole pouring transportation function can be mentioned.

[0126]As an organic metal complex, tris (8-quinolilato) aluminum, Bis(10-benzo[h] quinolate) beryllium, 2-(2'-hydroxyphenyl) BENZOOKI Southall's zinc salt, The zinc salt of 2-(2'-hydroxyphenyl) benzothia ZORU, the zinc salt of 4-hydroxy AKURIJIN, the zinc salt of 3-hydroxy FURABON, the beryllium salt of 5-hydroxy FURABON, the aluminum salt of 5-hydroxy FURABON, etc. can be mentioned.

[0127]as a SUCHIRUBEN derivative -- a - bis(2 and 2-diphenyl vinyl)biphenyl, and 1, 1, 4, and 4-tetra-phenyl 1, 3-butadiene, 4, and 4 '4, 4'-screw [(1, 1, 2-bird phenyl) Ethenyl] Biphenyl etc. can be mentioned.

[0128][as a coumarin derivative] Kumarin 1, Kumarin 6, Kumarin 7, Kumarin 30, Kumarin 106, Kumarin 138, Kumarin 151, Kumarin 152, Kumarin 153, Kumarin 307, Kumarin 311, Kumarin 314, Kumarin 334, Kumarin 338, Kumarin 343, Kumarin 500 etc. can be mentioned.

[0129]The desirable examples of a pyran derivative are DCM1, DCM2, etc., and the desirable example of oxazone derivative is the Nile red etc.

[0130]In the organic electroluminescence element of this invention, it is preferred to contain the compound denoted by the general formula (1) which starts this invention at a luminous layer.

[0131]When using together the compound denoted by the general formula (1) concerning this invention, and the compound which has other luminescence functions, [the rate of a compound denoted by the general formula (1) concerning this invention occupied in a luminous layer] It prepares to about 0.1 to 99.9weight % still more preferably about 0.01 to 99.99weight % more preferably about 0.001 to 99.999weight %.

[0132]As a compound which has other luminescence functions to use in this invention, a luminescent organic metal complex is preferred. For example, a luminous layer can also consist of a host compound and a guest compound (dopant) like a description in J.Appl.Phys., 65 and 3610 (1989), and JP,H5-214332,A.

[0133]A luminous layer can be formed using the compound denoted by the general formula (1) concerning this invention as a host compound, further, it can use as a guest compound and a luminous layer can also be formed.

[0134]When forming a luminous layer, using the compound denoted by the general formula (1) concerning this invention as a guest compound, [as a host compound] the compound which has other aforementioned luminescence functions can be mentioned -- for example, a luminescent organic metal complex or the aforementioned doria -- a reel amine derivative is more preferred.

[0135]in this case, a luminescent organic metal complex or doria -- the compound denoted by the general formula (1) concerning this invention to a reel amine derivative -- desirable -- about 0.001 to 40 weight % -- it is used especially about 0.1 to 20weight % preferably about 0.01 to

30weight %.

[0136]Especially as a luminescent organic metal complex used together with the compound denoted by the general formula (1) concerning this invention, although it does not limit, a luminescent organic aluminium complex is preferred and the luminescent organic aluminium complex in which at least 8-quinolate ** which is not replaced [substitution or] has a child is more preferred. As a luminescent desirable organic metal complex, the luminescent organic aluminium complex denoted by the general formula (a) - a general formula (c) can be mentioned, for example.

[0137](Q) (a) (as for Q, at least 8-quinolate ** which is not replaced [substitution or] expresses child among formula) $(Q)_2$-aluminum-O-L_3-aluminum (b) () [among a formula] $(Q)_2$-aluminum-O-aluminum-$(Q)_2$ (c) (as for Q, at least substitution 8-quinolate ** expresses a child among a formula) which, as for Q, at least substitution 8-quinolate ** expresses a child, and at least phenolate ** of O-L is a child and expresses the hydrocarbon group of the carbon numbers 6-24 in which L contains a phenyl portion

[0138]As an example of a luminescent organic metal complex, for example Tris (8-quinolate) aluminum, Tris (4-methyl 8-quinolate) aluminum, tris (5-methyl 8-quinolate) aluminum, Tris (3, 4-********- 8-quinolate) aluminum, tris (4, 5-********- 8-quinolate) aluminum, Tris (4, 6-********- 8-quinolate) aluminum, bis(2-methyl 8-quinolate)(phenolate) aluminum, Bis(2-methyl 8-quinolate)(2-methyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(3-methyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(4-methyl phenolate) aluminum, Bis(2-methyl 8-quinolate) (2-phenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(3-phenyl phenolate) aluminum, bis (2-methyl 8-quinolate)(4-phenyl phenolate) aluminum, bis(2-methyl 8-quinolate)(2, 3-JIMECHIRU phenolate) aluminum. Bis(2-methyl 8-quinolate)(2, 6-JIMECHIRU phenolate) aluminum, Bis(2-methyl 8-quinolate)(3, 4-JIMECHIRU phenolate) aluminum, Bis(2-methyl 8-quinolate)(3, 5-JIMECHIRU phenolate) aluminum, Bis(2-methyl 8-quinolate)(3, 5-G tert-butyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 6-diphenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 4, 6-bird phenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 4, 6-bird methyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 4, 5, 6-tetramethyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(1-naphth RATO) aluminum, bis(2-methyl 8-quinolate)(2-naphth RATO) aluminum, bis(2, 4-********- 8-quinolate)(2-phenyl phenolate) aluminum, Bis(2, 4-********- 8-quinolate)(3-phenyl phenolate) aluminum, Bis(2, 4-********- 8-quinolate)(4-phenyl

phenolate) aluminum, Bis(2, 4-********- 8-quinolate)(3, 5-dimethylphenyl phenolate) aluminum, Bis(2, 4-********- 8-quinolate)(3, 5-G tert-buthylphenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)aluminum mu-oxo bis(2-methyl 8-quinolate)aluminum, Bis(2, 4-********- 8-quinolate) aluminum mu-oxo bis(2, 4-********- 8-quinolate)aluminum, Bis(2-methyl 4-ethyl 8-quinolate) aluminum mu-oxo bis(2-methyl 4-ethyl 8-quinolate)aluminum, Bis(2-methyl 4-methoxy 8-quinolate)aluminum mu-oxo bis(2-methyl 4-methoxy 8-quinolate)aluminum, Bis(2-methyl 5-cyano 8-quinolate)aluminum mu-oxo bis(2-methyl 5-cyano 8-quinolate)aluminum, Bis(2-methyl 5-trifluoromethyl 8-quinolate)aluminum mu-oxo bis(2-methyl 5-trifluoromethyl 8-quinolate) aluminum etc. can be mentioned. Of course, a luminescent organic metal complex may be used alone, or may be used together. [two or more]

[0139]The electronic pouring transportation layer 5 is a layer containing the compound which has the function to convey the electron which makes pouring of the electron from the negative pole easy, and which was functioned and poured in.

[0140]The compound which has the compound and/or other electronic pouring transportation functions in which it is expressed with the general formula (1) which requires an electronic pouring transportation layer for this invention, For example, tris (8-quinolate) aluminum, bis(10-benzo[h] quinolate)beryllium, Organic metal complexes, such as beryllium salt of 5-hydroxy FURABON, and aluminum salt of 5-hydroxy FURABON; Oxadiazole derivatives, such as 1 and 3-bis[5'-(p-tert-buthylphenyl)-1, 3, and 4-oxadiazole 2'-IRU] benzene; [-- For example, 3-(4'-tert-buthylphenyl)-4-phenyl 5-(4"-biphenyl)-1, and 2 and 4 - doria -- bird azole derivative; triazine derivatives, such as ZORU,. It can form using a PERIREN derivative, a quinoline derivative, a quinoxaline derivative, a diphenyl quinone derivative, a nitroglycerine substitution fluorenone derivative, a thiopyran dioxide derivative, etc. at least one sort.

[0141]When using together the compound denoted by the general formula (1) concerning this invention, and the compound which has other electronic pouring transportation functions, the rate of a compound denoted by the general formula (1) concerning this invention occupied in an electronic pouring transportation layer is preferably prepared to about 0.1 to 40weight %.

[0142]In this invention, it is preferred to use together the compound and organic metal complex (for example, compound denoted by said general formula (a) - a general formula (c)) which are

denoted by the general formula (1) concerning this invention, and to form an electronic pouring transportation layer. It is preferred to use metal with a comparatively small work function, an alloy, or an electrical conductivity compound as an electrode substance as the negative pole 6.

[0143]As an electrode substance used for the negative pole, for example Lithium, a lithium indium alloy, Sodium, a sodium potassium alloy, calcium, magnesium, A magnesium silver alloy, a magnesium indium alloy, indium, RUTENIUMU, titanium, manganese, yttrium, aluminum, an aluminium-lithium alloy, an aluminum calcium alloy, an aluminum Magnesium alloy, a graphite thin film, etc. can be mentioned. These electrode substances may be used alone or may be used together. [two or more]

[0144]The negative pole can be formed on an electronic pouring transportation layer by methods, such as the vapor-depositing method, the sputtering method, the ionization vapor-depositing method, the ion plating method, and the cluster ion beam method, using these electrode substances. The negative pole may be structure much more, or may be multilayer structure. As for the sheet electrical resistance of the negative pole, it is preferred to set to below hundreds of ohms / **.

[0145]Although the thickness of the negative pole is based also on the material of the electrode substance to be used, generally it is more preferably set as about 10-500 nm about 5-1000 nm. In order to take out luminescence of an organic electroluminescence element efficiently, the translucent thing with at least one transparent electrode of an anode or the negative pole which is and carries out is preferred, and it is more preferred to set up the material of an anode and thickness generally, so that the transmissivity of luminescence light may be not less than 70%.

[0146]moreover -- in the organic electroluminescence element of this invention -- the -- the singlet oxygen quencher may contain in inside further at least. Especially as a singlet oxygen quencher, it does not limit, rubrene, a nickel complex, diphenyl iso benzofuran, etc. are mentioned, for example, and it is rubrene especially preferably.

[0147]Especially as a layer which the singlet oxygen quencher contains, although it does not limit, it is a luminous layer or an electron hole pouring transportation layer, and is an electron hole pouring transportation layer more preferably. For example, when making an electron hole pouring transportation layer contain a single paragraph quencher, it may be made to contain uniformly in an electron hole pouring transportation layer, and may be made to contain near an electron hole pouring transportation layer and the adjoining layer (for example, a luminous layer, the electronic pouring transportation layer which has a luminescence function).

[0148]0.01- of the amount of whole which constitutes the layer (for example, electron hole pouring transportation layer) to contain as content of a singlet oxygen quencher -- it is 0.1 to 20 weight % more preferably 0.05 to 30weight % 50weight %.

[0149][about the formation method of an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer] Not the thing limited especially but a vacuum evaporation method, the ionization vapor-depositing method, It can create by forming a thin film by the solution applying methods (for example, a spin coat method, the cast method, a dip coating method, the bar coat method, the roll coat method, a Langmuir-Blodgett method, the ink-jet method, etc.).

[0150]When forming each layer by a vacuum evaporation method, [the conditions of vacuum deposition] Although it does not limit in particular, it is preferred under the vacuum about 10^{-3}Pa to carry out at about 0.005-50nm/sec vapor deposition speed with the boat temperature (source temperature of vapor deposition) of about 50-600 ** and about [-50-300 **] substrate temperature.

[0151]In this case, each layers, such as an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer, can manufacture the organic electroluminescence element which was further excellent in many characteristics by forming continuously under a vacuum.

[0152]When forming each layers, such as an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer, by a vacuum evaporation

method using two or more compounds, it is preferred to carry out temperature control individually and to carry out vapor codeposition of each boat into which the compound was put.

[0153]By the solution applying method, when you form each layer, a solvent is dissolved or distributed and let the ingredient which forms each layer, or its ingredient and binder resin be coating liquid.

[0154][as binder resin which can be used for each layer of an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer] For example, poly-N-vinylcarbazole, poly arylate, polystyrene, Polyester, Pori Shiroki Sun, polymethyl acrylate, poly methyl methacrylate, Polyether, polycarbonate, polyamide, polyimide, polyamide imide, Poly paraxylene, polyethylene, poly phenylene oxide, polyether sulphone, High molecular compounds, such as poly aniline and its derivative, poly CHIOFEN and its derivative, poly phenylenevinylene and its derivative, poly full OREN and its derivative, poly thienylene BINIREN, and its derivative, are mentioned. Binder resin may be used alone or may be used together. [two or more]

[0155]When forming each layer by the solution applying method, a suitable organic solvent and/or water can be dissolved or distributed, the ingredient which forms each layer, or its ingredient and binder resin can be used as coating liquid, and a thin film can be formed by various kinds of applying methods.

[0156]As an example of an organic solvent, hexane, octane, Deccan, toluene, xylene, Hydrocarbon system solvents, such as ethyl benzene and 1-methylnaphthalene; Acetone, Ketone solvent, such as methyl ethyl ketone, methyl isobutyl ketone, and cyclohexanone; Dichloromethane, Chloroform, tetra-chloro methane, dichloro ethane, trichloroethane, Halogenated hydrocarbon system solvents, such as tetra-chloro ethane, chlorobenzene, dichlorobenzene, and chloro toluene; Ethyl acetate, Ester solvent, such as butyl acetate and amyl acetate; Methanol, propanol, Butanol, pen TANORU, HEKISANORU, cyclohexanol, methyl cellosolve, Alcoholic solvent, such as ethylcellosolve and ethylene glycol; Dibutyl ether, Ether system solvents, such as a tetrahydro franc, dioxane, and ANISORU; N and N-JIMECHIRU formamide, [as a polar solvent, in addition the methods of distributing, such as N

and N-JIMECHIRU aceto amide, a 1-methyl 2-pylori boss, 1-methyl 2-imidazolidinone and dimethyl sulfoxide,] Although it does not limit in particular, for example A ball mill, SANDOMIRU, a paint shaker, attritor, It can distribute in the shape of a particulate using a homogenizer etc.

[0157]It cannot limit, can set to the density range which was suitable for creating desired thickness by the applying method to enforce, especially concerning the concentration of coating liquid, and, generally is about 1 to 30weight % of solution concentration preferably about 0.1 to 50weight %. Concerning the amount used, when using binder resin, Although it does not restrict in particular, generally it sets up to about 15 to 90weight % more preferably about 10 to 99.9weight % about 5 to 99.9weight % to the ingredient which forms each layer (receiving the total amount of each ingredient, in forming the element of a model further).

[0158]Although it does not limit especially concerning the film thickness of an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer, generally it is preferred to set it as 5 nm - about 5 micrometers.

[0159]Provide a protection layer (closure layer) or in order to prevent contact with oxygen or moisture. [to the produced element] An element can be enclosed in inactive substances, such as paraffine, a liquid paraffin, silicone oil, fluorocarbon oil, and zeolite content fluorocarbon oil, for example, and can be protected.

[0160]The material which can mention an organic polymer material, the charge of non-equipments, a photo-setting resin, etc., and is used for a protection layer as a material used for a protection layer, for example may be used alone, or may be used together. [two or more] A protection layer may be structure much more, and may be multilayer structure.

[0161]As an example of an organic polymer material, fluorination resin, an epoxy resin, silicone resin, Epoxy silicone resin, polystyrene, polyester, polycarbonate, polyamide, polyimide, polyamide imide, poly paraxylene, polyethylene, poly phenylene oxide, etc. can be mentioned.

[0162]As a charge of non-equipments, diamond film, amorphous silica, and electrical-insulation-properties glass, a metal oxide, metal nitride, a metal carbonation thing, metallic sulfide, etc. can be mentioned.

[0163]A metal oxide film (for example, aluminum oxide film) and a metal fluoridation film can also be provided in an electrode as a protection layer, for example. For example, the interface layer (intermediate layer) which comprises an organophosphorus compound, polysilane, an aromatic amine derivative, and a phthalocyanine derivative can also be provided on the surface of an anode. An electrode, for example, an anode, can also process and use the surface with acid, ammonia/hydrogen peroxide, or plasma, for example.

[0164]Generally, the organic electroluminescence element of this invention can be used also as a pulse drive type or alternating current drive type element, although used as a direct-current drive type element. Generally seal-of-approval voltage is about 2-30V.

[0165]The organic electroluminescence element of this invention can be used for a panel type light source, various kinds of light emitting elements, various kinds of display elements, various kinds of signs, various kinds of sensors, etc., for example.

[0166]

[Working example]Although the example of manufacture and a work example explain this invention still in detail below, this invention is not limited at all by these examples.

[0167](Example 1 of manufacture) Manufacture 2-(4'-bromo phenyl)-5 of the illustration compound A-1 - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -Heating churning of 3, 5.70 g of 4-diphenyl CHIOFEN, 1.69 g of diphenylamine, the potassium carbonate 2.07g, and 7.94 g of the copper powder was carried out at 180-185 ** among 50 ml of o-dichlorobenzene, and under a nitrogen atmosphere for 10 hours. Then, the reaction mixture was cooled to 100 ** and toluene was added. After cooling the reaction mixture to room temperature and filtering an insoluble matter, **** was washed and o-dichlorobenzene and toluene were distilled off under decompression.

Silica gel column chromatography refined ****, and also the re-crystal was performed using toluene, and 4.75 g was obtained for the compound of the illustration compound number A-1 as a light yellow crystal.

[0168](Example 2 of manufacture) In the example 1 of manufacture manufacture of the illustration compound A-4, 5.38g of compounds of the illustration compound number A-4 were obtained as a light yellow crystal instead of 1.69 g of diphenylamine according to operation of a description for the example 1 of manufacture except having used 2.19 g of 1-phenyl friend nona FUTAREN.

[0169](Example 3 of manufacture) In the example 1 of manufacture manufacture of the illustration compound B-3, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2"-phenyl 2 "-methyl 1"-ethenyl) phenyl] -According to operation of a description, 4.23g of compounds of the illustration compound number B-3 were obtained as a light yellow crystal for the example 1 of manufacture except having used 1.67 g of carbazole for 5.84 g of 3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0170](Example 4 of manufacture) In the example 1 of manufacture manufacture of the illustration compound B-9, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2"-phenyl 2 "-methyl 1"-ethenyl) phenyl] -According to operation of a description, 4.98g of compounds of the illustration compound number B-9 were obtained as a light yellow crystal for the example 1 of manufacture except having used 4-phenylamino biphenyl 2.45g for 5.84 g of 3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0171](Example 5 of manufacture) In the example 1 of manufacture manufacture of the illustration compound C-1, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2"-phenyl 1 "-methyl 1"-ethenyl) phenyl] -According to operation of a description, 3.88g of compounds of the illustration compound number C-1 were obtained as a light yellow crystal for the example 1 of manufacture except having used 5.84 g of 3 and 4-diphenyl CHIOFEN.

[0172](Example 6 of manufacture) In the example 1 of manufacture manufacture of the illustration compound C-17, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5-{4' instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [2"-(1"'-Naff Chill)-1 "- methyl 1"-ethenyl] According to operation of a description, 4.82g of compounds of the illustration compound number C-17 were obtained as a light yellow crystal for the example 1 of manufacture except having used 2.19 g of 1-phenyl friend nona FUTAREN for 6.34 g of phenyl}-3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0173](Example 7 of manufacture) In the example 1 of manufacture manufacture of the illustration compound D-16, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5-{4' instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [2"-(4"'-phenyl phenyl)-2"-methyl 1 "- methyl 1"-ethenyl] According to operation of a description, 5.20g of compounds of the illustration compound number D-16 were obtained as a light yellow crystal for the example 1 of manufacture except having used 6.74 g of phenyl}-3 and 4-diphenyl CHIOFEN.

[0174](Example 8 of manufacture) In the example 1 of manufacture manufacture of the illustration compound E-2, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5-{4' instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [2", 2"- JI (4"'-methylphenyl)-1"-ethenyl] According to operation of a description, 5.45g of compounds of the illustration compound number E-2 were obtained as a light yellow crystal for the example 1 of manufacture except having used the JI (4-methylphenyl) amine 1.97g for 6.74 g of phenyl}-3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0175](Example 9 of manufacture) In the example 1 of manufacture manufacture of the illustration compound E-15, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2", 2 "- diphenyl 1"-ethenyl) phenyl] -According to operation of a description, 5.86g of compounds of the illustration compound number E-15 were obtained as a light yellow crystal for the example 1 of manufacture except having used the JI (2-Naff Chill) amine 2.69g for 6.46 g of 3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0176](Example 10 of manufacture) In the example 1 of manufacture manufacture of the illustration compound E-23, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5-{4' instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [2", 2"- JI (1"'-Naff Chill)-1"-ethenyl] According to operation of a description, 6.10g of compounds of the illustration compound number E-23 were obtained as a light yellow crystal for the example 1 of manufacture except having used 7.46 g of phenyl}-3 and 4-diphenyl CHIOFEN.

[0177](Example 11 of manufacture) In the example 1 of manufacture manufacture of illustration compound F-1, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2 "2 "- diphenyl 1"-methyl 1"-ethenyl) phenyl] -According to operation of a description, 5.23g of compounds of illustration compound number F-1 were obtained as a light yellow crystal for the example 1 of manufacture except having used 6.60 g of 3 and 4-diphenyl CHIOFEN.

[0178](Example 12 of manufacture) In the example 1 of manufacture manufacture of the illustration compound F-22, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5-{4' instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [2 "- phenyl 2"-(4"'-phenyl phenyl)-1"-methyl 1"-ethenyl] According to operation of a description, 6.18g of compounds of the illustration compound number F-22 were obtained as a light yellow crystal for the example 1 of manufacture except having used 7.36 g of phenyl}-3 and 4-diphenyl CHIOFEN.

[0179](Example 13 of manufacture) In the example 1 of manufacture manufacture of the illustration compound G-3, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2"-phenyl 1 "-phenyl 1"-ethenyl) phenyl] -According to operation of a description, 4.65g of compounds of the illustration compound number G-3 were obtained as a light yellow crystal for the example 1 of manufacture except having used 1.83 g of phenoxazine for 6.46 g of 3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0180](Example 14 of manufacture) In the example 1 of manufacture manufacture of the illustration compound G-19, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2"-phenyl 1 "-

phenyl 1"-ethenyl) phenyl] -According to operation of a description, 5.16g of compounds of the illustration compound number G-19 were obtained as a light yellow crystal for the example 1 of manufacture except having used the JI (4-methoxypheny) amine 2.29g for 6.46 g of 3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0181](Example 15 of manufacture) In the example 1 of manufacture manufacture of the illustration compound H-9, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5-{4' instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [2 "- methyl 2"-(4"'-methoxypheny)-1"-phenyl 1"-ethenyl] According to operation of a description, 4.85g of compounds of the illustration compound number H-9 were obtained as a light yellow crystal for the example 1 of manufacture except having used 6.90 g of phenyl}-3 and 4-diphenyl CHIOFEN.

[0182](Example 16 of manufacture) In the example 1 of manufacture manufacture of the illustration compound H-16, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5-{4' instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [2 "- methyl 2"-(4"'-phenyl phenyl)-1"-phenyl 1"-ethenyl] According to operation of a description, 6.47g of compounds of the illustration compound number H-16 were obtained as a light yellow crystal for the example 1 of manufacture except having used 2.19 g of 1-phenyl friend nona FUTAREN for 7.36 g of phenyl}-3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0183](Example 17 of manufacture) In the example 1 of manufacture manufacture of the illustration compound I-1, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2 "2 "- diphenyl 1"-phenyl 1"-ethenyl) phenyl] -According to operation of a description, the compound of the illustration compound number I-1 was g Obtained as a light yellow crystal for the example 1 of manufacture except having used 7.22 g of 3 and 4-diphenyl CHIOFEN.

[0184](Example 18 of manufacture) In the example 1 of manufacture manufacture of the illustration compound I-19, it is 2-(4'-bromo phenyl)-5. - [4'-(2 "- phenyl 1"-ethenyl) phenyl] -It is 2-(4'-bromo phenyl)-5 instead of 5.70 g of 3 and 4-diphenyl CHIOFEN. - [4'-(2 "2 "- diphenyl 1"-phenyl 1"-ethenyl) phenyl] -According to operation of a description, 6.19g of compounds of the

illustration compound number I-19 were obtained as a light yellow crystal for the example 1 of manufacture except having used 2.19 g of 2-phenyl friend nona FUTAREN for 7.22 g of 3 and 4-diphenyl CHIOFEN instead of 1.69 g of diphenylamine.

[0185](Work example 1) The glass substrate which has a 200-nm-thick ITO transparent electrode (anode) was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $4x10^{-3}$Pa. First, it is a 4 and 4'-screw on an ITO transparent electrode. [N-phenyl N-(3"-methylphenyl) amino] Biphenyl was vapor-deposited in thickness of 75 nm at 0.2nm/sec in vapor deposition speed, and it was considered as the electron hole pouring transportation layer. Subsequently, on it, from a different source of vapor deposition, vapor codeposition (weight ratio 100:0.5) of the compound of bis(2-methyl 8-quinolate)(4-phenyl phenolate) aluminum and the illustration compound number A-1 was carried out to a thickness of 50 nm at 0.2nm/sec in vapor deposition speed, and it was made into the luminous layer. Next, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed, and was made into the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, they were made into the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 55 mA/cm^2 flowed into it. Luminescence of the blue-green of luminosity 2420 cd/m^2 was checked.

[0186](Work examples 2-18), [in the work example 1] [instead of using the compound of the illustration compound A-1 when forming a luminous layer] The compound (work example 2) of the illustration compound number A-4, the compound of the illustration compound number B-3 (work example 3), The compound (work example 4) of the illustration compound number B-9, the compound of the illustration compound number C-1 (work example 5), The compound (work example 6) of the illustration compound number C-17, the compound of the illustration compound number D-16 (work example 7), The compound (work example 8) of the illustration compound number E-2, the compound of the illustration compound number E-15 (work example 9), The compound (work example 10) of the illustration compound number E-23, the compound of illustration compound number F-1 (work example 11), The compound (work

example 12) of the illustration compound number F-22, the compound of the illustration compound number G-3 (work example 13), The compound (work example 14) of the illustration compound number G-19, the compound of the illustration compound number H-9 (work example 15), The organic electroluminescence element was produced by the method of the description in the work example 1 except having used the compound (work example 16) of the illustration compound number H-16, the compound (work example 17) of the illustration compound number I-1, and the compound (work example 18) of the illustration compound number I-19. When the direct-current voltage of 12V was impressed to each element under dry atmosphere, luminescence of blue - blue-green was checked. The characteristic was investigated and the result was shown in (the 1st table).

[0187](Comparative example 1), [in the work example 1] [when forming a luminous layer] [for not using the compound of the illustration compound number A-1] Only using bis(2-methyl 8-quinolate)(4-phenyl phenolate) aluminum, it vapor-deposited in thickness of 50 nm, and the organic electroluminescence element was produced by the method of the description in the work example 1 except having considered it as the luminous layer. Blue luminescence was checked when the direct-current voltage of 12V was impressed to this element under dry atmosphere. The characteristic was investigated and the result was shown in (the 1st table).

[0188](Comparative example 2) In the work example 1, the organic electroluminescence element was produced by the method of the description in the work example 1 except having used N-methyl 2-methoxy AKURIDON instead of using the compound of the illustration compound number A-1 when forming a luminous layer. Blue luminescence was checked when the direct-current voltage of 12V was impressed to this element under dry atmosphere. The characteristic was investigated and the result was shown in (the 1st table).

[0189]

[Table 1]

第１表

有機電界発光素子	輝度（ｃｄ／ｍ2）	電流密度（ｍＡ／ｃｍ2）
実施例２	２４２０	５４
実施例３	２３４０	５５
実施例４	２４４０	５４
実施例５	２３８０	５４
実施例６	２３６０	５５
実施例７	２３２０	５４
実施例８	２４８０	５３
実施例９	２３９０	５５
実施例１０	２３４０	５４
実施例１１	２５１０	５５
実施例１２	２３４０	５３
実施例１３	２４２０	５６
実施例１４	２３４０	５４
実施例１５	２３６０	５３
実施例１６	２４４０	５６
実施例１７	２３４０	５６
実施例１８	２３３０	５５
比較例１	１１７０	８２
比較例２	１５５０	７４

[0190](Work example 19) The glass substrate which has a 200-nm-thick ITO transparent electrode (anode) was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was

decompressed to $4x10^{-4}$Pa. First, they are 4, 4', and 4"-tris on an ITO transparent electrode. [N-(3"'-methylphenyl)-N-phenylamino] At 0.1nm/sec in vapor deposition speed, bird phenylamine was vapor-deposited in thickness of 50 nm, and was made into the first electron hole pouring transportation layer. Subsequently, 4, 4', - screw [N-phenyl N-(1"-Naff Chill) amino] Vapor codeposition (weight ratio 100:5.0) of biphenyl and the compound of the illustration compound number A-1 was carried out to a thickness of 20 nm at 0.2nm/sec in vapor deposition speed from a different source of vapor deposition, and it was considered as the luminous layer which served as the second electron hole pouring transportation layer. Subsequently, on it, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed, and was made into the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, they were made into the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Under dry atmosphere, when the direct-current voltage of 15V was impressed to the produced organic electroluminescence element, the current of 60 mA / cm^2 flowed into it. Luminescence of the blue-green of luminosity 2620 cd/m^2 was checked.

[0191](Work examples 20-36) Formation of a luminous layer is faced in the work example 19, Instead of using the compound of the illustration compound A-1, the compound of the illustration compound number A-4 (work example 20), The compound (work example 21) of the illustration compound number B-3, the compound of the illustration compound number B-9 (work example 22), The compound (work example 23) of the illustration compound number C-1, the compound of the illustration compound number C-17 (work example 24), The compound (work example 25) of the illustration compound number D-16, the compound of the illustration compound number E-2 (work example 26), The compound (work example 27) of the illustration compound number E-15, the compound of the illustration compound number E-23 (work example 28), The compound (work example 29) of illustration compound number F-1, the compound of the illustration compound number F-22 (work example 30), The compound (work example 31) of the illustration compound number G-3, the compound of the illustration compound number G-19 (work example 32), The compound (work example 33) of the illustration compound number H-9, the compound of the illustration compound number H-16 (work example 34), The organic electroluminescence element was produced by the method of the description in the work example 19 except having used the compound (work example 35) of the illustration compound number I-1, and the compound (work example 36) of the illustration compound number I-19. When the direct-current voltage of 15V was impressed to

each element under dry atmosphere, luminescence of blue - blue-green was checked. The characteristic was investigated and the result was shown in (the 2nd table).

[0192]

[Table 2]

第２表

有機電界発光素子	輝度（ｃｄ／ｍ2）	電流密度（ｍＡ／ｃｍ2）
実施例２０	２６４０	５４
実施例２１	２６３０	５６
実施例２２	２５８０	５７
実施例２３	２５３０	５５
実施例２４	２５２０	５４
実施例２５	２５４０	５５
実施例２６	２５９０	５７
実施例２７	２４８０	５７
実施例２８	２６２０	５５
実施例２９	２６２０	５４
実施例３０	２６１０	５４
実施例３１	２５８０	５６
実施例３２	２４９０	５６
実施例３３	２５５０	５４
実施例３４	２６４０	６３
実施例３５	２４７０	５５
実施例３６	２４５０	５６

[0193](Work example 37) The glass substrate which has a 200-nm-thick ITO transparent electrode (anode) was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $4x10^{-4}$Pa. First, it is a 4 and 4'-screw on an ITO transparent electrode. [N-phenyl N-(3"-methylphenyl) amino] Biphenyl was vapor-deposited in thickness of 75 nm at 0.2nm/sec in vapor deposition speed, and it was considered as the electron hole pouring transportation layer. Subsequently, on it, from a different source of vapor deposition, vapor codeposition (weight ratio 100:2.0) of the compound of bis(2-methyl 8-quinolate)(4-phenyl phenolate) aluminum and the illustration compound number A-1 was carried out to a thickness of 50 nm at 0.2nm/sec in vapor deposition speed, and it was made into the luminous layer. Next, 1, 3-screw [5'-(4"-tert-buthylphenyl)-1', 3', 4 '- oxadiazole 2'-IRU] Benzene was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed, and was made into the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, they were made into the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 54 mA / cm^2 flowed into it. Luminescence of the blue-green of luminosity 2560 cd/m^2 was checked.

[0194](Work example 38), [in the work example 37] [instead of using the compound of bis(2-methyl 8-quinolate)(4-phenyl phenolate) aluminum and the illustration compound A-1 when forming a luminous layer] Using the compound of tris (8-quinolate) aluminum and the illustration compound number C-17, vapor codeposition (weight ratio 100:4.0) was carried out to a thickness of 50 nm, and the organic electroluminescence element was produced by the method of the description in the work example 37 except having considered it as the luminous layer. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 56 mA / cm^2 flowed into it. Luminescence of the blue-green of luminosity 2680 cd/m^2 was checked.

[0195](Work example 39), [in the work example 37] [instead of using the compound of bis(2-methyl 8-quinolate)(4-phenyl phenolate) aluminum and the illustration compound A-1 when forming a luminous layer] The compound of bis(2-methyl 8-quinolate)aluminum mu-oxo bis(2-methyl 8-quinolate)aluminum and the illustration compound number E-15 is used, Vapor codeposition (weight ratio 100:3.0) was carried out to a thickness of 50 nm, and the organic electroluminescence element was produced by the method of the description in the work example 37 except having considered it as the luminous layer. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 51 mA / cm^2 flowed into it. Luminescence of the blue-green of luminosity 2570 cd/m^2 was checked.

[0196](Work example 40) The glass substrate which has a 200-nm-thick ITO transparent electrode (anode) was cleaned ultrasonically using neutral detergent, acetone, and ethanol. It dried using nitrogen gas, and also UV/ozone wash carried out the substrate. Next, they are a compound of poly-N-vinylcarbazole (weight average molecular weight 150000) and the illustration compound number A-1, and Kumarin 6 on an ITO transparent electrode. ["3-(2'-benzothiazolyl)-7-diethylamino Kumarin]" (green luminescence ingredient) And DCM-1 ["[4-(dicyanomethylene)-2-methyl 6-(4'-dimethylaminostyryl)-4H-Piran]" (orange luminescence ingredient)] A 400-nm luminous layer was formed with the dip coating method using 3weight % of the dichloro ethane solution contained at a rate of the weight ratio 100:5:3:2, respectively. Next, after fixing to the substrate holder of an evaporation apparatus the glass substrate which has this luminous layer, the vapor deposition tub was decompressed to $4x10^{-4}$Pa. a luminous layer top -- 3-(4'-tert-buthylphenyl)-4-phenyl 5-(4"-phenyl phenyl)-1, and 2 and 4 - doria, after vapor-depositing ZORU in thickness of 20 nm at 0.2nm/sec in vapor deposition speed, On it, tris (8-quinolate) aluminum was vapor-deposited in thickness of 30 nm at 0.2nm/sec in vapor deposition speed, and was made into the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, they were made into the negative pole, and the organic electroluminescence element was produced. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 73 mA / cm^2 flowed into it. White luminescence of luminosity 1420 cd/m^2 was checked.

[0197](Work examples 41-48), [in the work example 40] [instead of using the compound of

the illustration compound number A-1] The compound (work example 41) of the illustration compound number B-9, the compound of the illustration compound number C-1 (work example 42), The compound (work example 43) of the illustration compound number D-16, the compound of the illustration compound number E-2 (work example 44), The compound (work example 45) of the illustration compound number F-22, the compound of the illustration compound number G-3 (work example 46), The organic electroluminescence element was produced by the method of the description in the work example 40 except having used the compound (work example 47) of the illustration compound number H-16, and the compound (work example 48) of the illustration compound number I-19. White luminescence was observed when the direct-current voltage of 12V was impressed to each element under dry atmosphere. The characteristic was investigated and the result was shown in (the 3rd table).

[0198]

[Table 3]

第３表

有機電界発光素子	輝度（ｃｄ／ｍ2）	電流密度（ｍＡ／ｃｍ2）
実施例４１	１５８０	７８
実施例４２	１２８０	７６
実施例４３	１３５０	７４
実施例４４	１２４０	７１
実施例４５	１２６０	７５
実施例４６	１３４０	６８
実施例４７	１５３０	７７
実施例４８	１４６０	７４

[0199](Work example 49) The glass substrate which has a 200-nm-thick ITO transparent electrode (anode) was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $4x10^{-4}$Pa. First, on the ITO transparent electrode, the compound of the illustration compound number A-4 was vapor-deposited in thickness of 75 nm at 0.2nm/sec in vapor deposition speed, and it was considered as the electron hole pouring transportation layer. Subsequently, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed on it, and it was considered as the luminous layer which served as the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, they were made into the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 55 mA / cm^2 flowed into it. Green luminescence of luminosity 2690 cd/m^2 was checked.

[0200](Work example 50) In the work example 49, the organic electroluminescence element was produced by the method of the description in the work example 49 except having used the compound of the illustration compound number B-3 instead of using the compound of the illustration compound number A-4 when forming an electron hole pouring transportation layer. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 57 mA / cm^2 flowed into it. Green luminescence of luminosity 2880 cd/m^2 was checked.

[0201](Work example 51) In the work example 49, the organic electroluminescence element was produced by the method of the description in the work example 49 except having used the compound of the illustration compound number C-1 instead of using the compound of the illustration compound number A-4 when forming an electron hole pouring transportation layer. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 55 mA / cm^2 flowed into it. Green luminescence of luminosity 2630 cd/m^2 was checked.

[0202](Work example 52) In the work example 49, the organic electroluminescence element was produced by the method of the description in the work example 49 except having used the compound of the illustration compound number E-2 instead of using the compound of the illustration compound number A-4 when forming an electron hole pouring transportation layer. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 54 mA / cm^2 flowed into it. Green luminescence of luminosity 2530 cd/m^2 was checked.

[0203](Work example 53) In the work example 49, the organic electroluminescence element was produced by the method of the description in the work example 49 except having used the compound of the illustration compound number I-1 instead of using the compound of the illustration compound number A-4 when forming an electron hole pouring transportation layer. Under dry atmosphere, when the direct-current voltage of 12V was impressed to the produced organic electroluminescence element, the current of 55 mA / cm^2 flowed into it. Green luminescence of luminosity 2740 cd/m^2 was checked.

[0204]

[Effect of the Invention]It became possible to provide the organic electroluminescence element which was excellent in luminescence luminosity by this invention. It became possible to provide a compound suitable for this light emitting element.

[Brief Description of the Drawings]

[Drawing 1]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 2]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 3]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 4]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 5]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 6]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 7]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 8]It is an outline construction drawing of an example of an organic electroluminescence element.

[Explanations of letters or numerals]1 :board 2 luminous layer 4': -- luminous layer (layer which mixed luminescence ingredient and electron hole pouring transportation ingredient) 4": -- luminous layer (layer which mixed luminescence ingredient and electronic pouring transportation ingredient) 4" -- ': -- luminous layer : Anode 3 : Electron hole pouring transportation layer 4 : (luminescence ingredient.) Layer 5 which mixed the electron hole pouring transportation ingredient and the electronic pouring transportation ingredient : Electronic pouring transportation layer 6 : Negative pole 7 : Power supply

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[Translation done.]